

SHEET INDEX

CONTENTS	SHEET NO.	ISSUE NO.																								
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	B1B	2	3	3	3	3	7	7																		
FS2 INTERNAL CONNECTION OF THE KS-21447, LIST 2, LIST 7, & LIST 9 MINI-RECORDER	B2A	1	2	3	4	4	4	7	8																	
	B2B		3	3	3	3	7	7																		
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FS3 TOR, EOT, BOT, LPEW SENSING & STATUS GENERATION FOR THE KS-21447, LIST 1 MINI-RECORDER																										
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FS4 TOR, EOT, BOT, LPEW SENSING & STATUS GENERATION FOR THE KS-21447, LIST 2 MINI-RECORDER																										
FS5 MOTOR CONTROL ELECTRONICS FOR LIST 1 AND LIST 8	B5	1	2	2	2	2	2	2	2																	
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FS7 INTERNAL CONNECTION OF KS-21447 LIST 3 AND LIST 4	B7A	1	2	3	4	4	4	7	8																	
	B7B	2	3	3	3	3	7	7																		
	B8	1	2	3	3	3	3	8																		
FS8 INTERNAL CONNECTION OF KS-21447 LIST 5, LIST 6 AND LIST 10	B9A	2	3	4	4	4	7	8																		
	B9B	2	3	3	3	3	7	7																		
	B10	2	3	3	3	3	8																			
FS9 INTERNAL CONNECTION OF KS-21447 LIST 8	B11A	2	3	4	4	4	7	8																		
	B11B		3	3	3	3	7	7																		
	B12	2	3	3	3	3	8																			
APP FIG. 1 KS-21447, LIST 1	C1	1	2	3	3	3	7	8																		
APP FIG. 2 KS-21447, LIST 2, LIST 7, AND LIST 9	C2	1	2	3	3	3	7	8																		
APP FIG. 3 KS-21447, LIST 3, LIST 4	C3	1	2	3	3	3	7	8																		
APP FIG. 4 KS-21447, LIST 5, LIST 6, AND LIST 10	C4	2	3	3	3	3	7	8																		
APP FIG. 5 KS-21447, LIST 8	C5	2	3	3	3	3	7	8																		
NOTES CIRCUIT EQUIPMENT INFORMATION	C1	1	2	3	4	5	6	7	8																	
CAD 1																										
CAD 2	G1	1	2	3	3	3	7	8																		
CAD 3																										
CAD 4	G2	1	2	2	2	2	7	8																		
CAD 5	G3	2	3	3	3	3	7	8																		

CONTENTS	SHEET NO.	ISSUE NO.																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
CPS1-1 & CPS1-2 LOGIC & CONTROL CIRCUIT	J1A	1	2	3	3	3	3	3	8																	
	J1B	1	2	3	3	3	3	3	3																	
	J1C	1	2	3	3	3	3	7	8																	
CPS2 SERVO CIRCUIT	J2A	1	2	3	4	4	4	4	4																	
	J2B	1	1	3	3	3	3	3	3																	
	J2C	1	2	3	4	4	4	4	8																	
CPS3-1 THRU CPS 3-5 WRITE CIRCUIT	J3A	1	2	3	3	3	3	3	3																	
	J3B	1	2	2	2	2	2	2	2																	
	J3C	1	2	2	2	2	2	2	8																	
ⓑ CPS4-1 THRU CPS4-4 READ CIRCUIT	J4A	1	2	3	3	5	6	7	8																	
	J4B	1	2	3	3	3	3	7	7																	
	J4C	1	2	3	3	5	6	7	7																	
Ⓐ CPS4-1 THRU CPS 4-4 READ CIRCUIT	J4D							7	8																	
	J4E							7	8																	
	J4F							7	8																	
	J4G							7	7																	
CPS5 LOGIC & WRITE CIRCUIT	J5A	1	1	3	3	3	3	3	3																	
	J5B	1	2	3	3	3	3	3	8																	
	J5C	1	2	3	3	3	3	7	8																	
CM1 - ANALOG DETECTION CIRCUIT	K1A					5	5	CANCELLED																		
	K1B					5	5	CANCELLED																		

SHEET INDEX NOTES

- WHEN CHANGES ARE MADE IN THIS DRAWING, ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.
- THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED.
- THE ISSUE NUMBER ASSIGNED TO A CHANGED OR NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE SHEET INDEX.
- SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER.
- THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT DRAWING (ASSEMBLY)	L-51005
REQUIREMENTS	L-510108
REQUIREMENTS (CPS)	L-510109
WIRING DIAGRAM	L-510137

NOTICE-- NOT FOR USE OR DISCLOSURE OUTSIDE THE BELL SYSTEM EXCEPT UNDER WRITTEN AGREEMENT.

COMMON SYSTEMS
KS-21447 MINI-RECORDER CIRCUIT
FOR RECORDING AND REPRODUCING
DIGITAL DATA

2

BELL TELEPHONE LABORATORIES
INCORPORATED

65

SD-97736-01-A1

47 SHEETS

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DWG ISSUE	CD ISSUE	DATE ISSUED	BY	CHKD	APPD
1	1	3-27-75	EGP	RAG	WHS
2B	2B	3-19-76	JEN	RAG	WHS
3B	2B	3-18-77	JEN	RAG	WHS
4B	2B	1-6-78	JEN	RAG	WHS
5A	2B	1-6-78	JEN	RAG	WHS
6A	2B	2-3-79	JEN	RAG	WHS
7A	2B	2-3-79	JEN	RAG	WHS
8B	2B	2-3-79	JEN	RAG	WHS

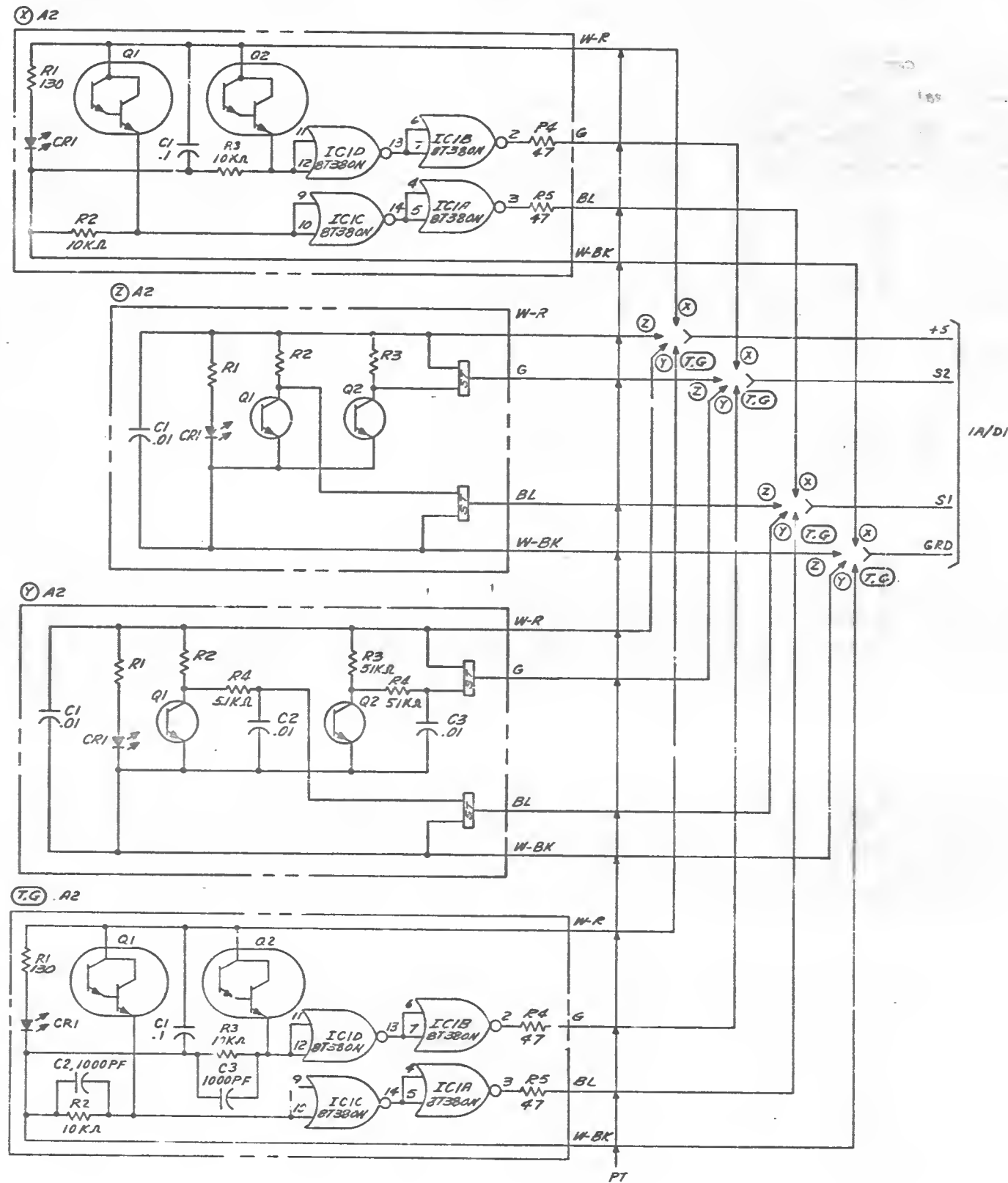
ISSUE

8B1

APPARATUS INDEX										OPTION INDEX															
DESIG			APP FIG		LOCATION			DESIG			APP FIG		LOCATION			APP OR WIR			RATED ON ISSUE		REF NOTES		LOCATION		
CIRCUIT PACKS			NO	SH NO	FS	APP FIG	EQPT	HEADS, FERRITE			FS	APP FIG	EQPT	SWITCHES			APP OR WIR	RATED ON ISSUE	REF NOTES	LOCATION					
CP1-1	2	C2	ASSEMBLY, BACK PLANE			A1	1A/A2	1	HEADS, FERRITE			1A/B1	1	SWITCHES			P			APP FIGS. 1,2,3,4,5 1A/B2,2A/B2,7A/B2, 9A/B2,11A/B2					
CP1-1	3	C3	A1	2A/A2	2				-	2A/B1	2	S1			1A/A2	1	N			APP FIGS. 1,2,3,4,5 1A/B2,2A/B2,7A/B2, 9A/B2,11A/B2					
CP1-1	4	C4	A1	7A/A2	3				-	7A/B1	3	S1			9A/A2	3	M			APP FIGS. 2,4,5 3EO,10EO,12EO					
CP1-2	5	C5	A1	9A/A2	4				-	9A/B1	4	S1			9A/A2	4	L			APP FIGS. 2,4,5 3EO,10EO,12EO					
CP2	1	C1	A1	11A/A2	5				-	11A/B1	5	S1			7A/A2	5	K			APP FIGS. 2,4,5 3EO,10EO,12EO					
CP2	2	C2										S2			3G2	2	J			APP FIGS. 2,4,5 3EO,10EO,12EO					
CP2	3	C3										S2			10F2	3	G			APP FIGS. 2,4,5 3EO,10EO,12EO					
CP2	4	C4										S2			10G2	4				APP FIGS. 2,4,5 3EO,10EO,12EO					
CP2	5	C5																			APP FIGS. 2,4,5 3EO,10EO,12EO				
CP3-1	2	C2																			APP FIGS. 2,4,5 3EO,10EO,12EO				
CP3-2	3	C3																			APP FIGS. 2,4,5 3EO,10EO,12EO				
CP3-2	4	C4																			APP FIGS. 2,4,5 3EO,10EO,12EO				
CP3-2	5	C5																			APP FIGS. 2,4,5 3EO,10EO,12EO				
CP3-5	2	C2																			APP FIGS. 2,4,5 3EO,10EO,12EO				
ASSEMBLY, HEAD TWO TRACK			CAPACITORS			COMPONENT ASSEMBLIES			MOTOR ASSEMBLIES																
A3	1A/FO, 1A/D9	1	C1	1A/B2	1	CA1	1A/CO	1	B1	1A/B1	1														
			C1	2A/B2	2	CA1	2A/CO	2	B1	2A/B1	2														
			C1	7A/B2	3	CA1	2A/EO	2	B1	7A/B1	3														
			C1	9A/B2	4	CA1	7A/CO	3	B1	9A/B1	4														
			C1	11A/B2	5	CA1	9A/CO, 10EO	4	B1	11A/B1	5														
C2	1A/B2	1	C2	1A/B2	1	CA1	9A/CO, 10EO	4																	
C2	2A/B2	2	C2	7A/B2	3	CA1	11A/CO	5																	
C2	7A/B2	3	C2	9A/D2	4																				
C2	9A/D2	4	C2	11A/B2	5																				
C2	11A/B2	5																							
ASSEMBLY, HEAD FOUR TRACK																									
A3	2A/D8, 2A/FO, 3FB	2																							
A3	7A/D8, 7A/FO	3																							
A3	9A/D8, 9A/FO	4																							
A3	11A/D8, 11A/F1	5																							
ASSEMBLY, SENSOR HOUSING																									
A2	1B/AO- 1A/FO	1																							
A2	2B/AO- 2B/FO	2																							
A2	7B/AO, 7B/CO 7B/FO	3																							
A2	9B/AO- 9B/FO	4																							
A2	11B/AO, 11B/CO	5																							

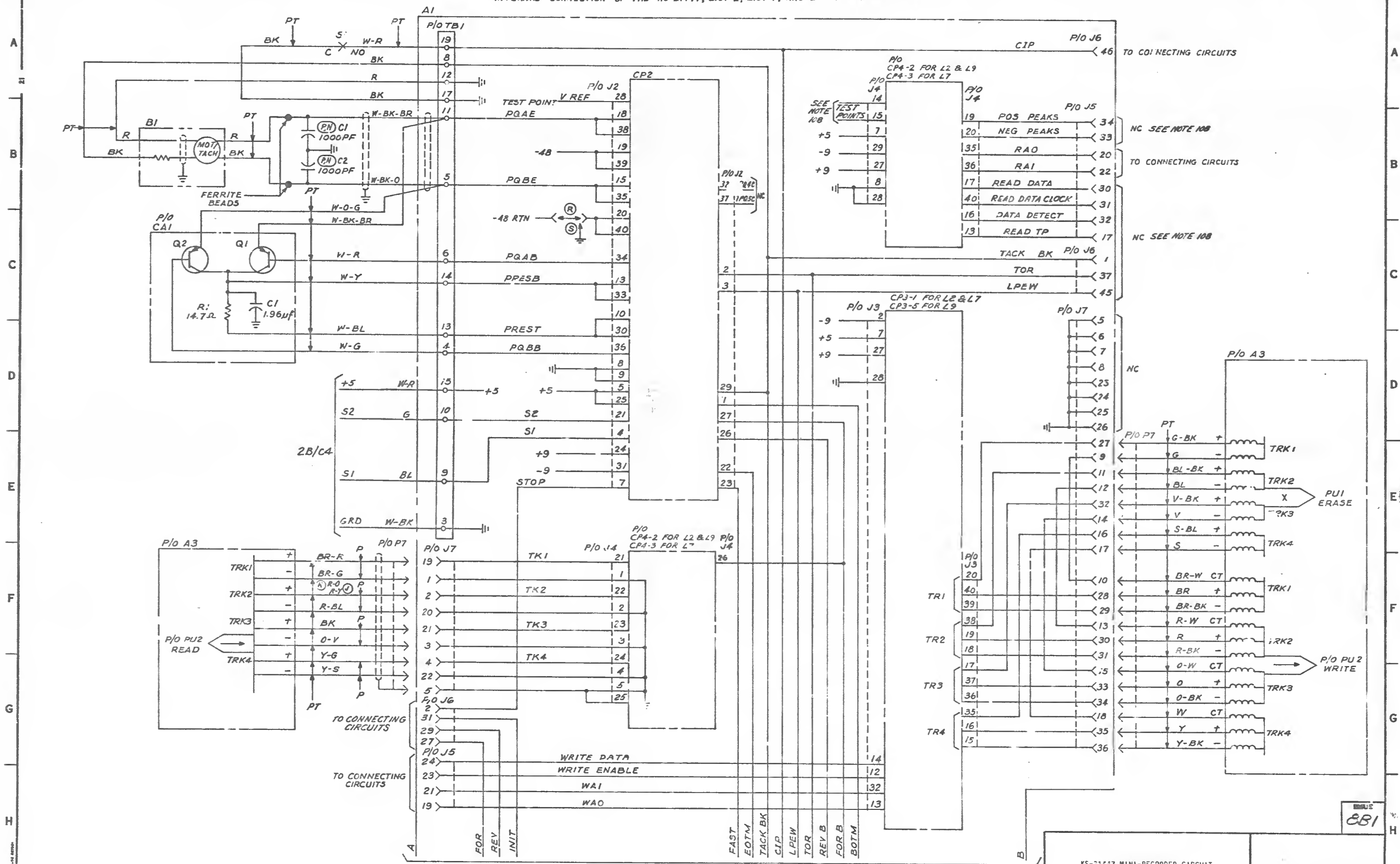
0 1 2 3 4 5 6 7 8 9

PART OF FS 1
INTERNAL CONNECTION OF THE KS-21447, LIST 1
MINI-RECORDER



PART OF FS 2

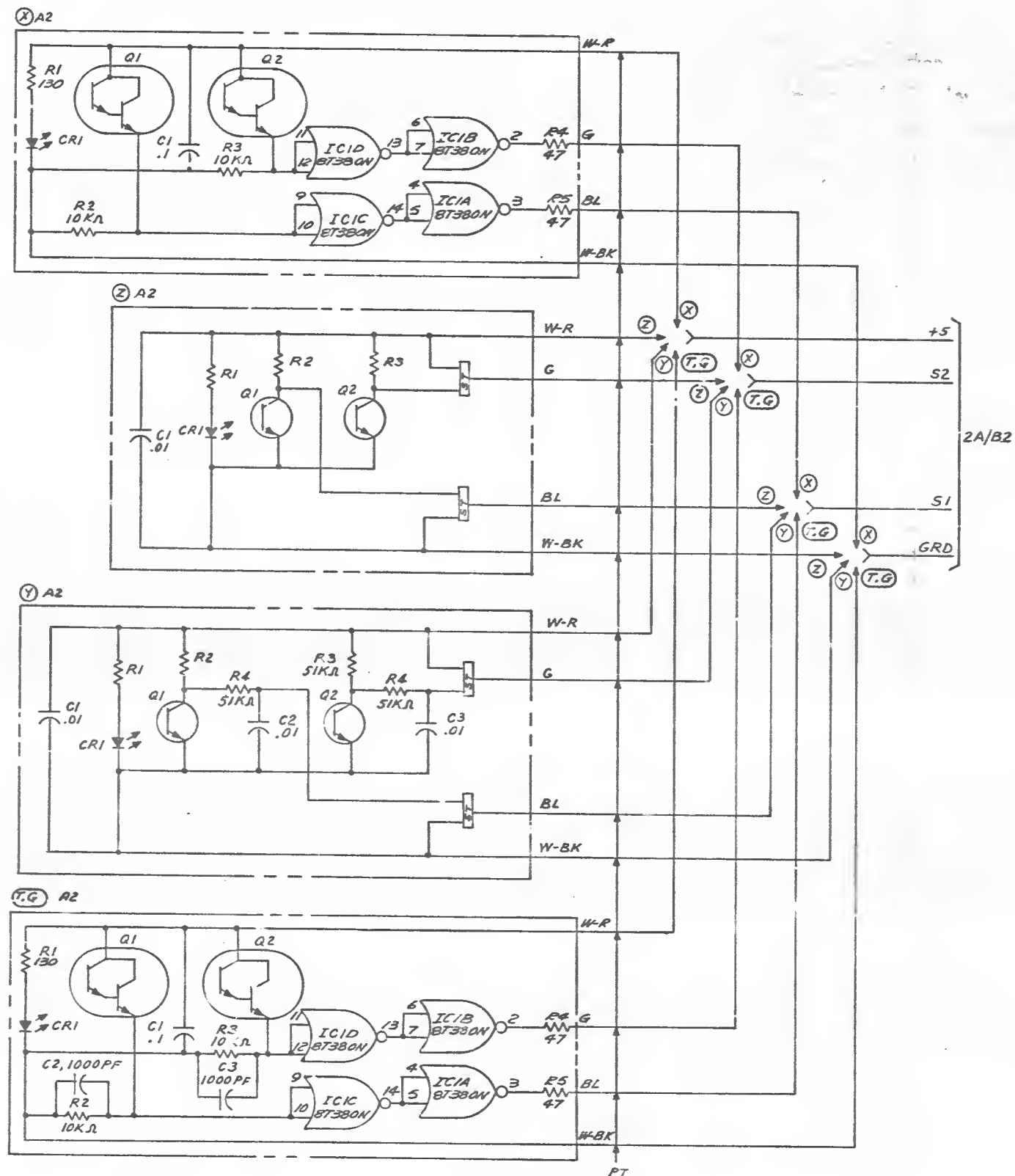
INTERNAL CONNECTION OF THE KS-21447, LIST 2, LIST 7, AND LIST 9 MINI-RECORDER



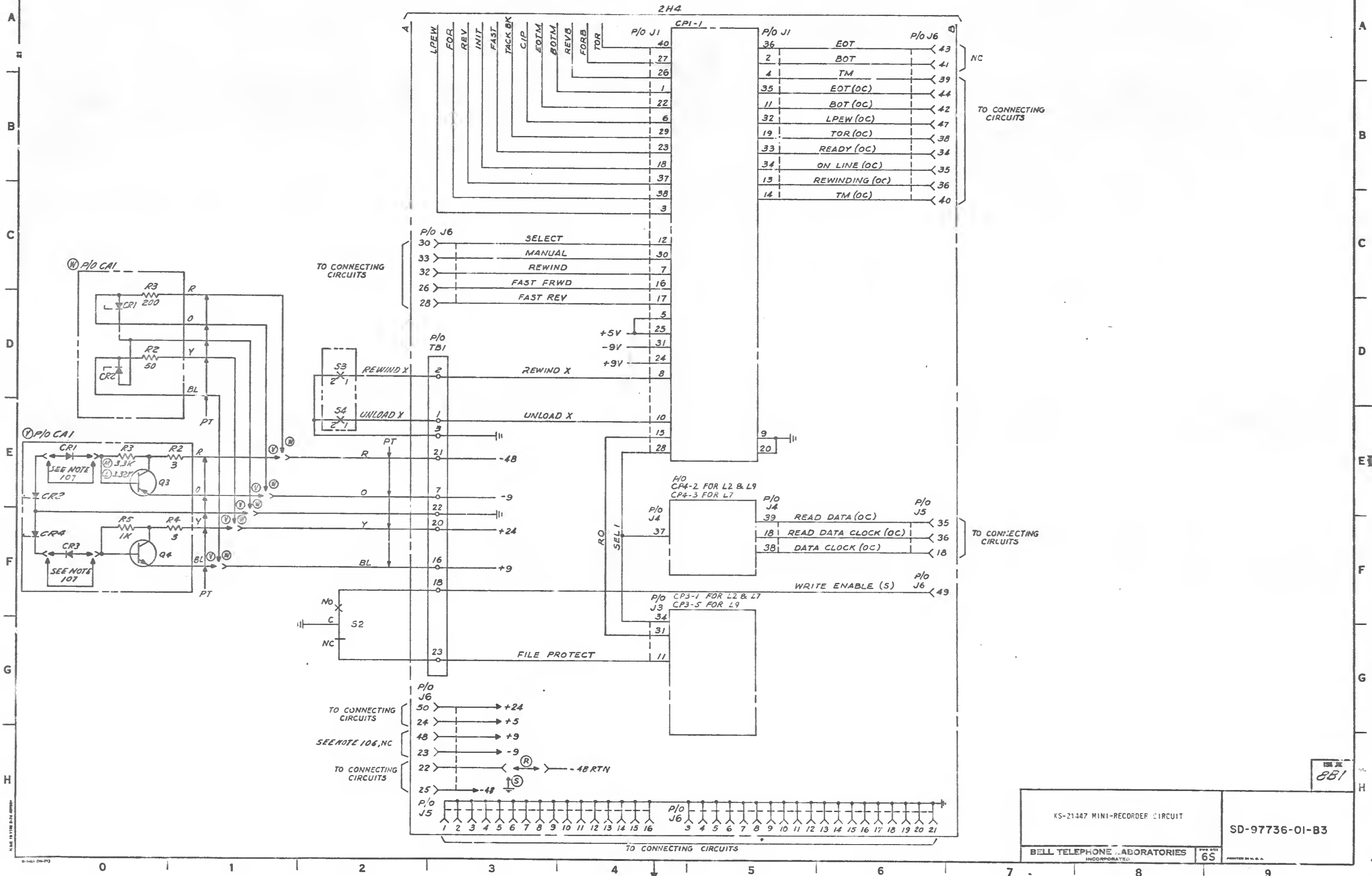
SD-97736-01-B2A

0 1 2 3 4 5 6 7 8 9

PART OF FS 2
INTERNAL CONNECTION OF THE KS-21447, LIST 2, LIST 7, AND LIST 9 MINI-RECORDER

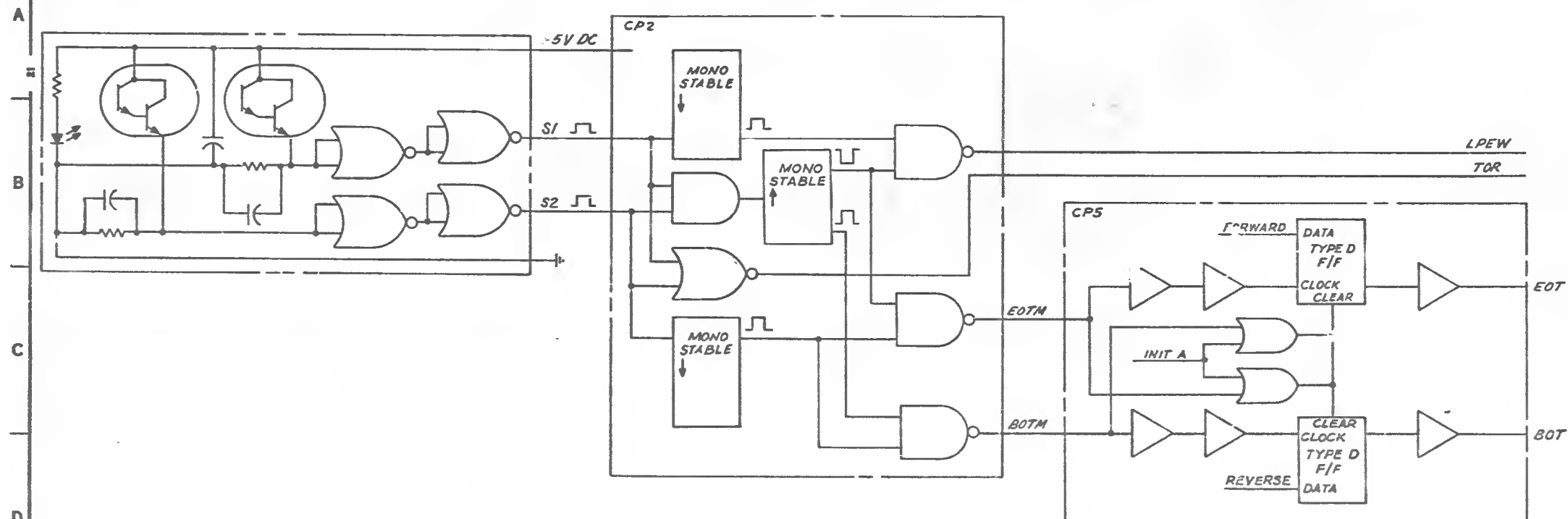


PART OF FS 2 INTERNAL CONNECTION OF KS-21447, LIST 2, LIST 7, AND LIST 9 MINI-RECORDER

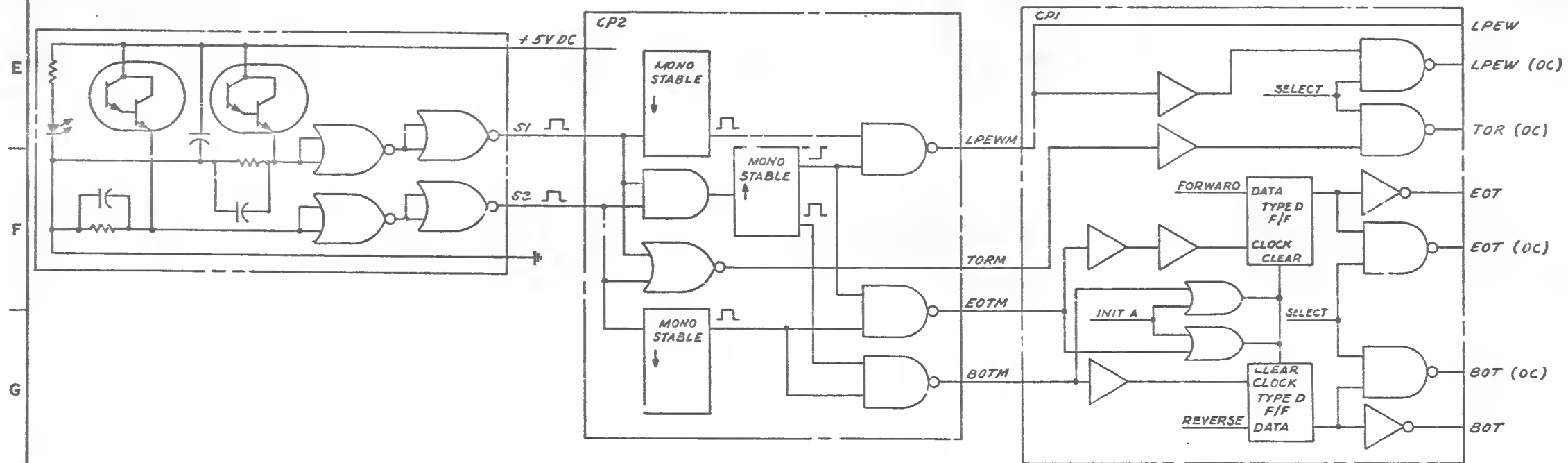


SD-97736-01-B3

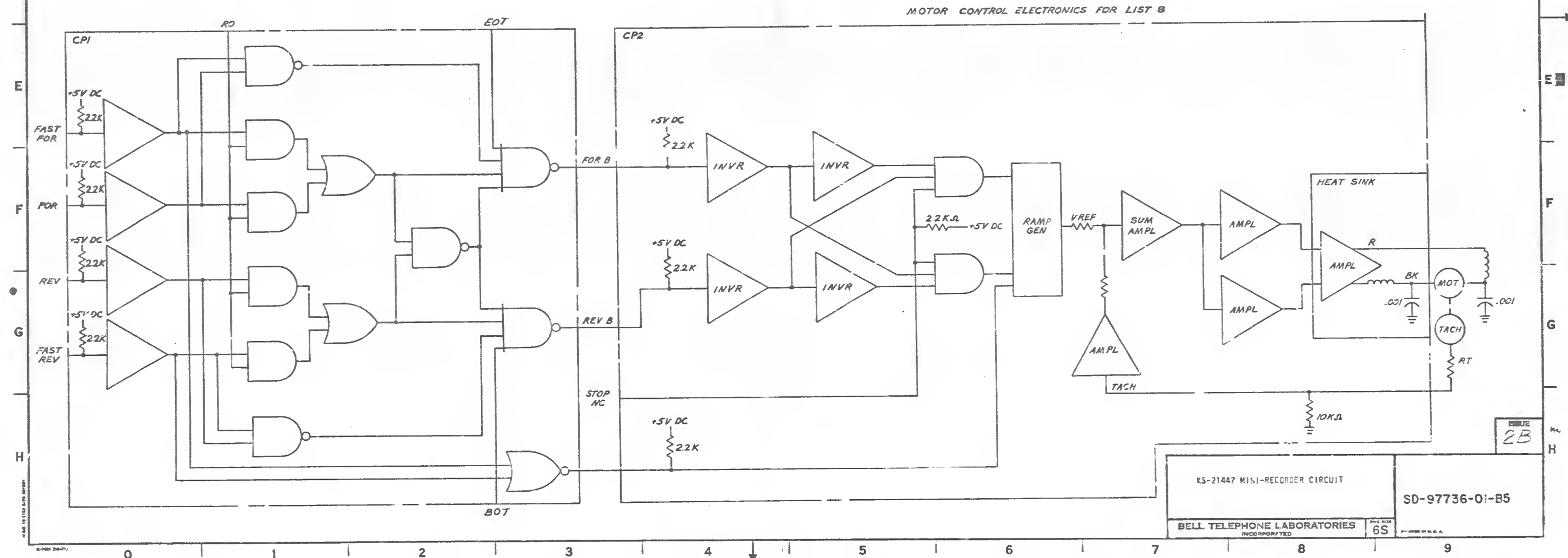
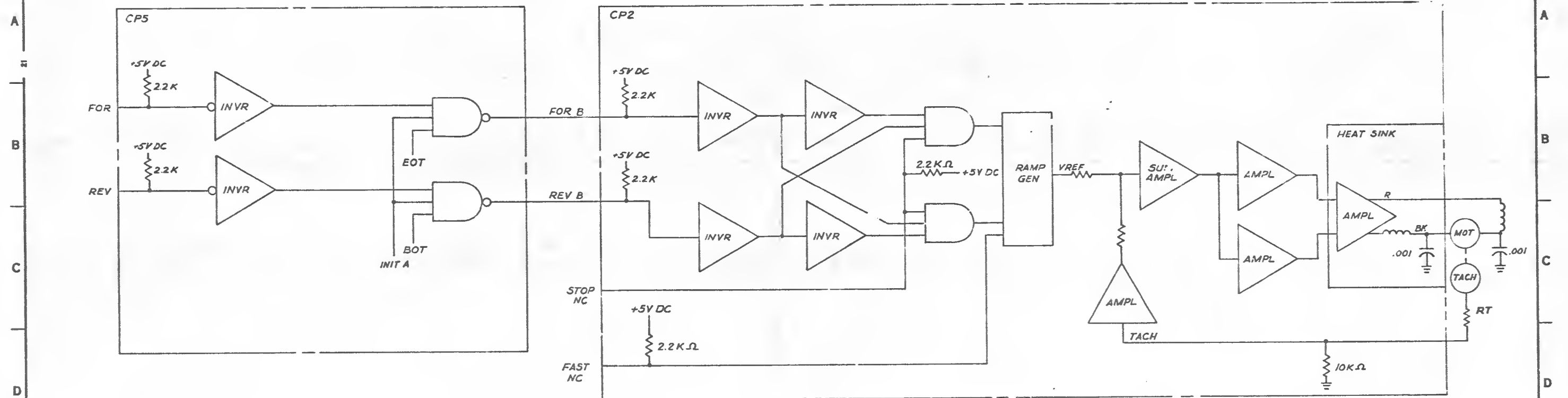
FS 3
TOR, EOT, BOT, LPEW SENSING & STATUS GENERATION FOR LIST 1



FS 4
TOR, EOT, BOT, LPEW SENSING & STATUS GENERATION EXCEPT LIST 1



SD-97736-01-B4



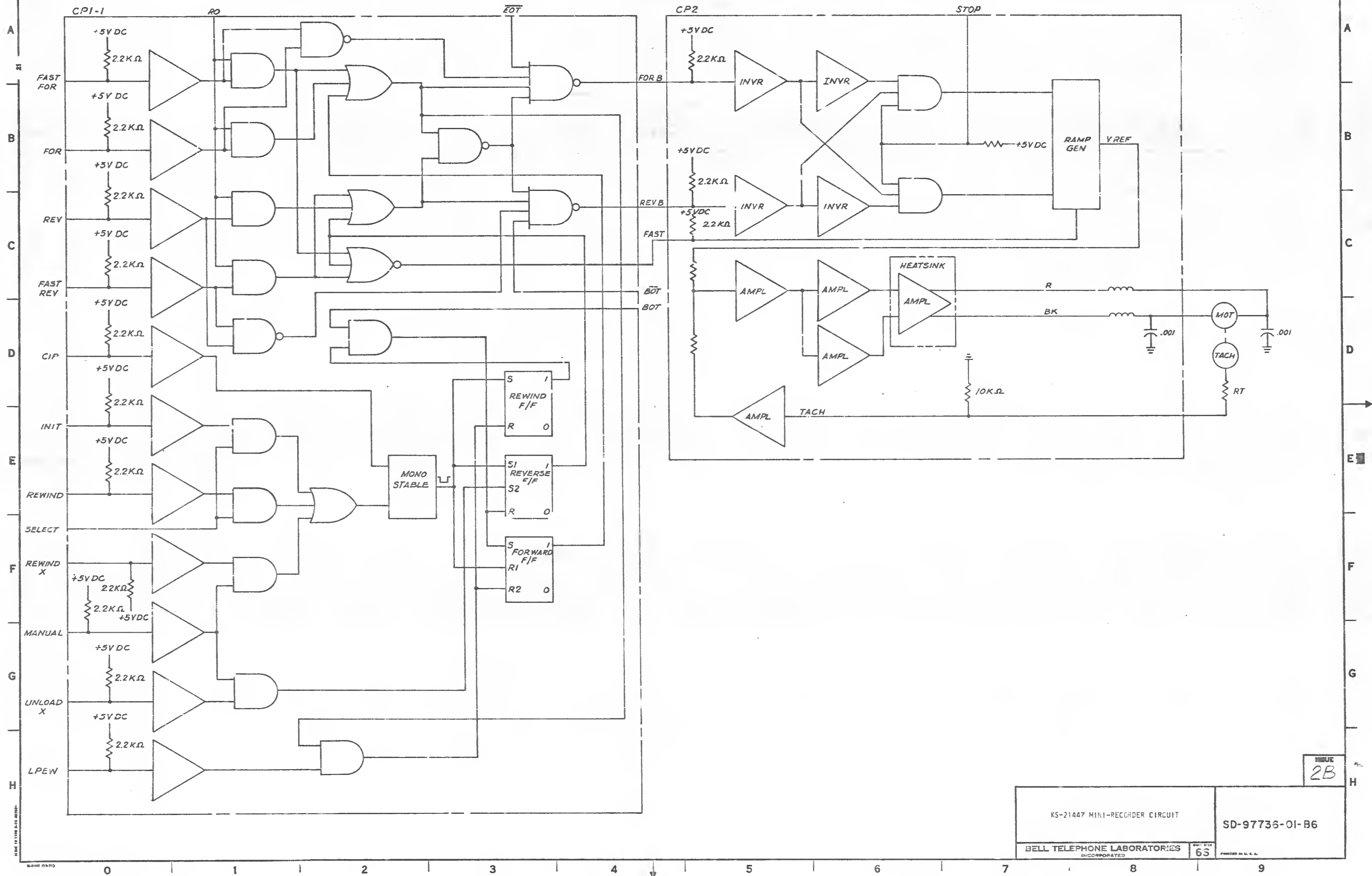
KS-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

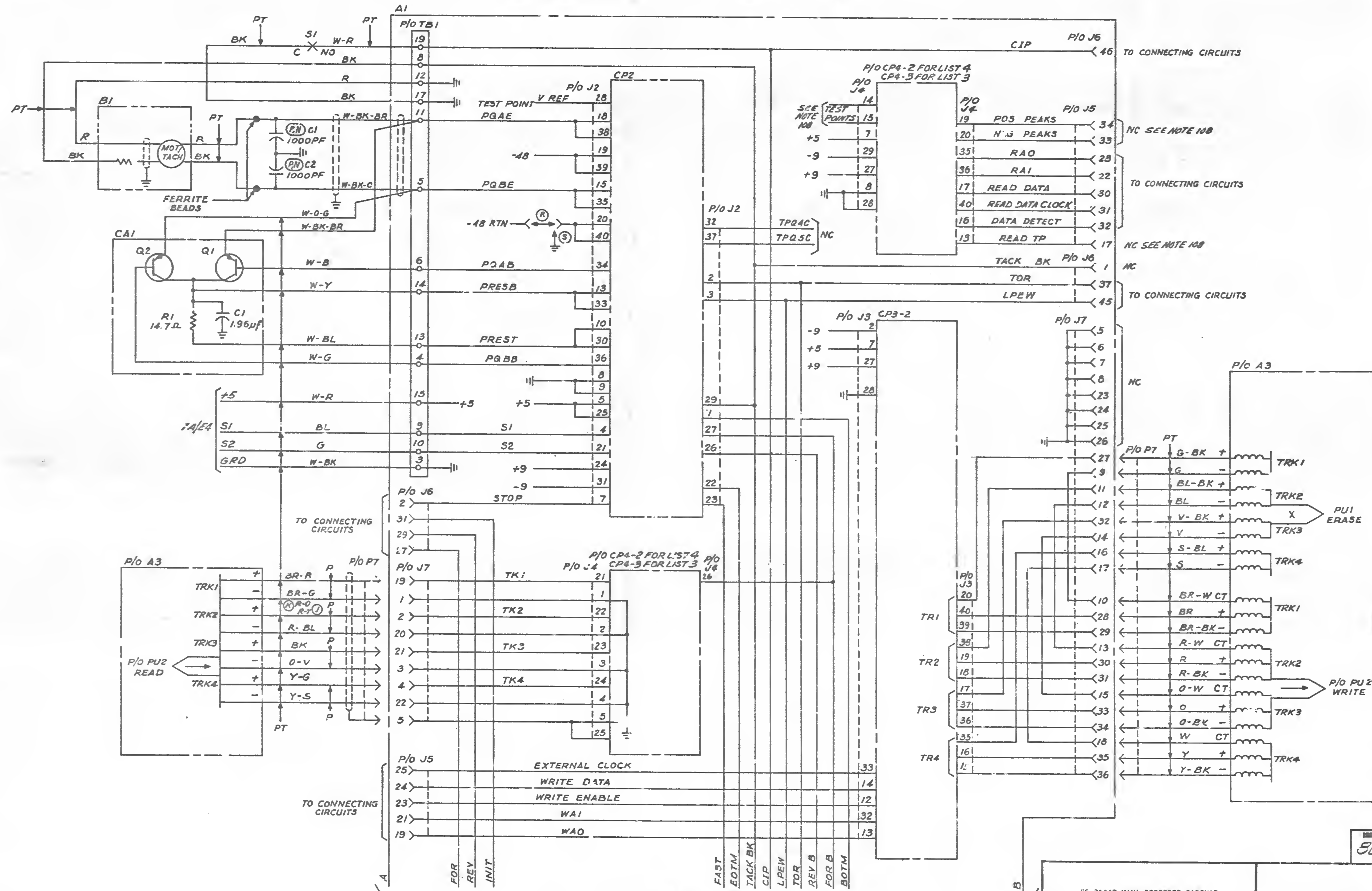
6S

SD-97736-01-B5

FIGURE 2B



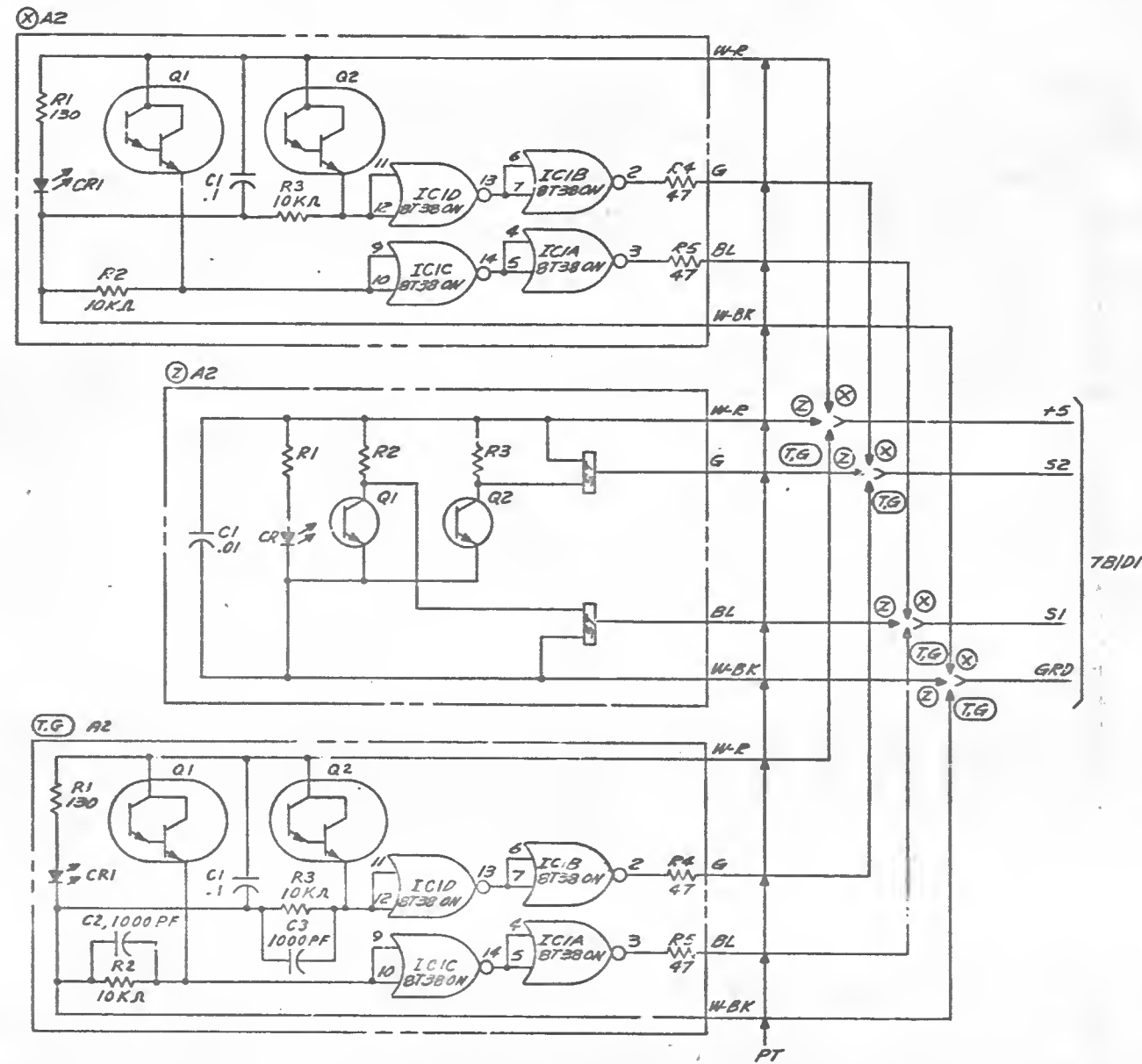
PART OF FS 7 INTERNAL CONNECTION OF THE KS-21447 LIST 3 AND LIST 4 MINI-RECORDER



SD-97736-01-B7

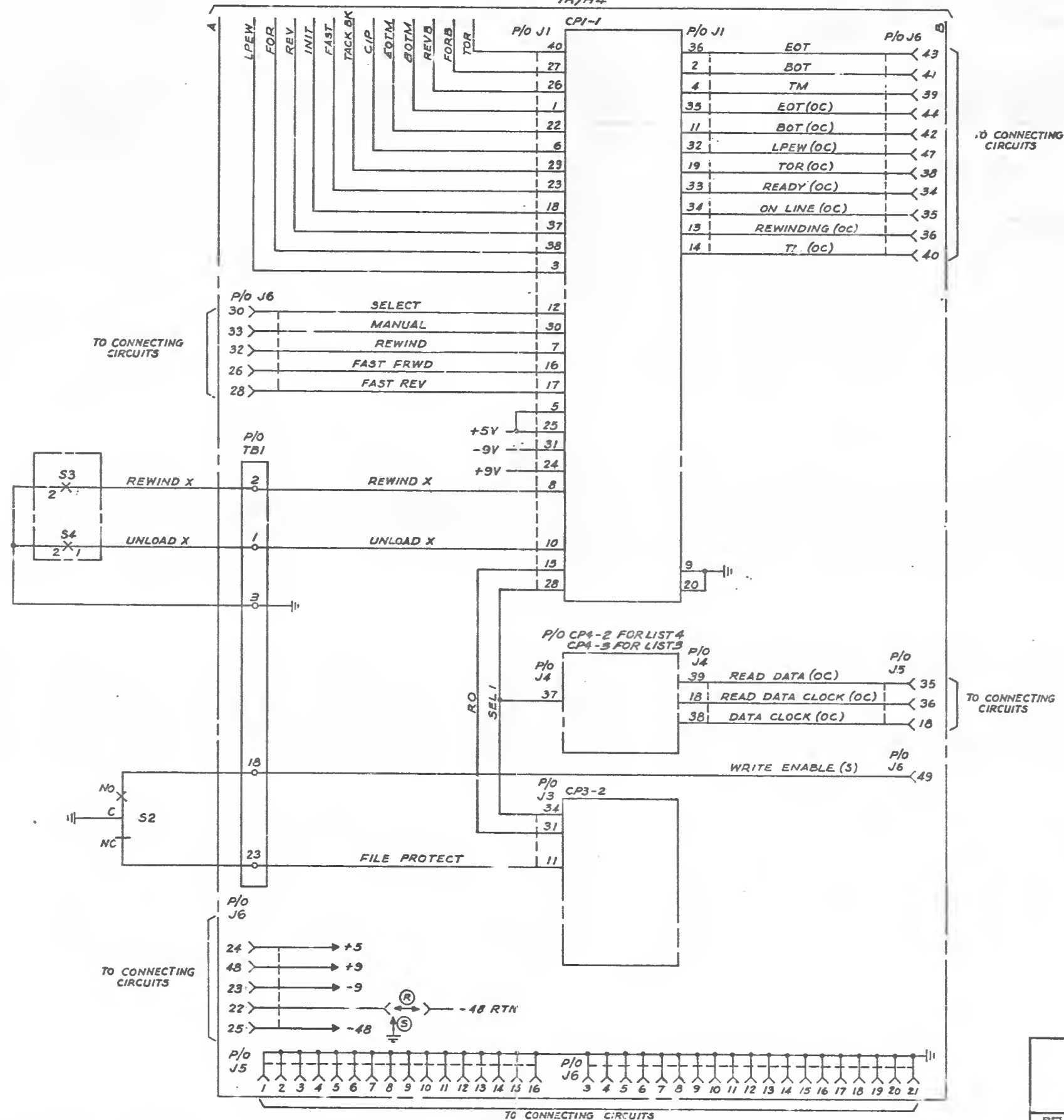
0 1 2 3 4 5 6 7 8 9

PART OF FS 7
INTERNAL CONNECTION OF THE
KS-21447 LIST 3 AND LIST 4 MINI-RECORDER



PART OF FS 7
INTERNAL CONNECTION OF KS-21447, LIST 3 AND LIST 4
MINI-RECORDER

7A/H4



SD-97736-01-B8

KS-21447 MINI-RECORDER CIRCUIT

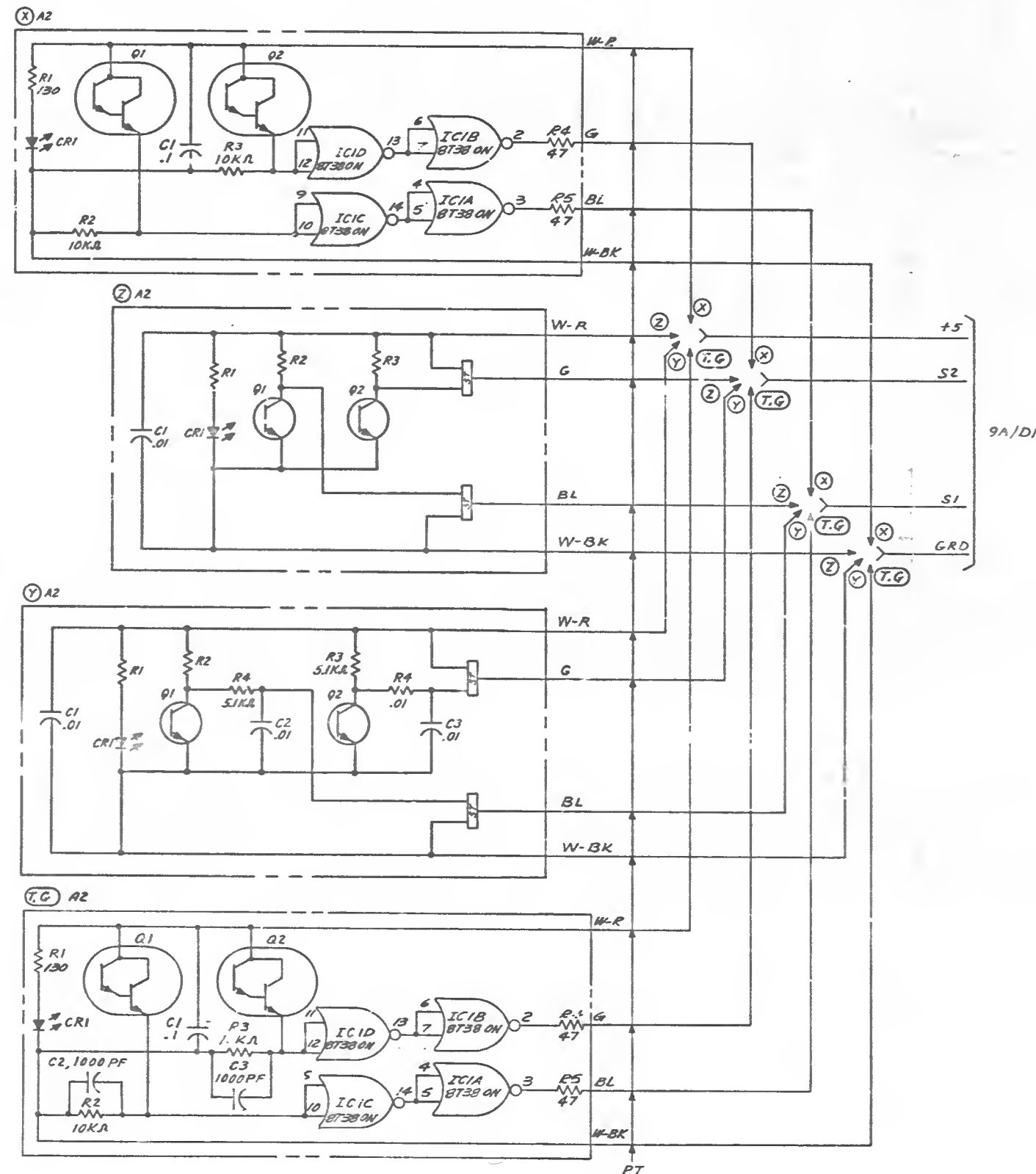
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BELL TELEPHONE LABORATORIES

6S

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PART OF FS 8
INTERNAL CONNECTIONS OF THE KS-21447, LIST 5, LIST 6 AND LIST 10
MINI-RECORDER



KS-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

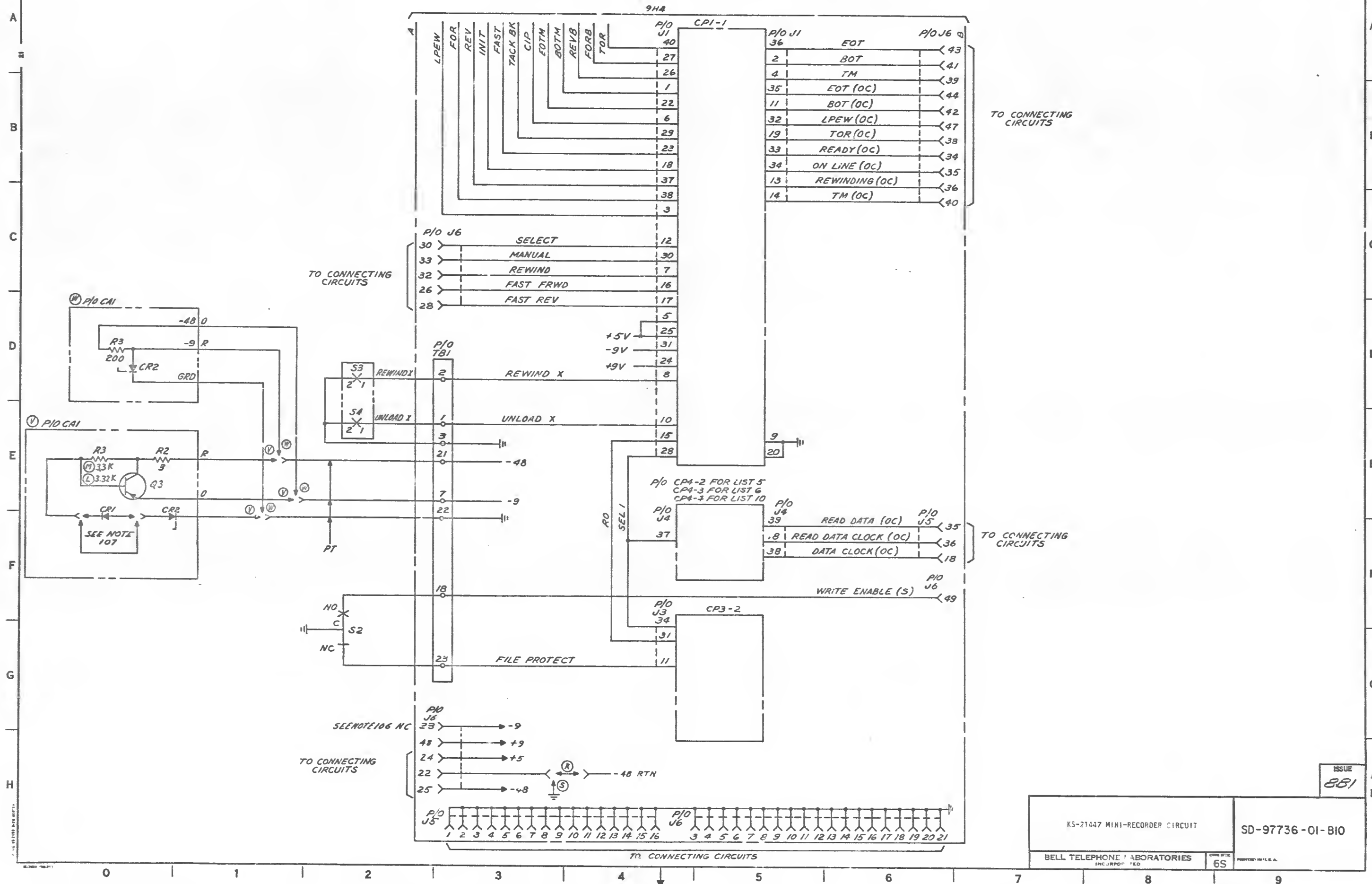
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SD-97736-01-B9B

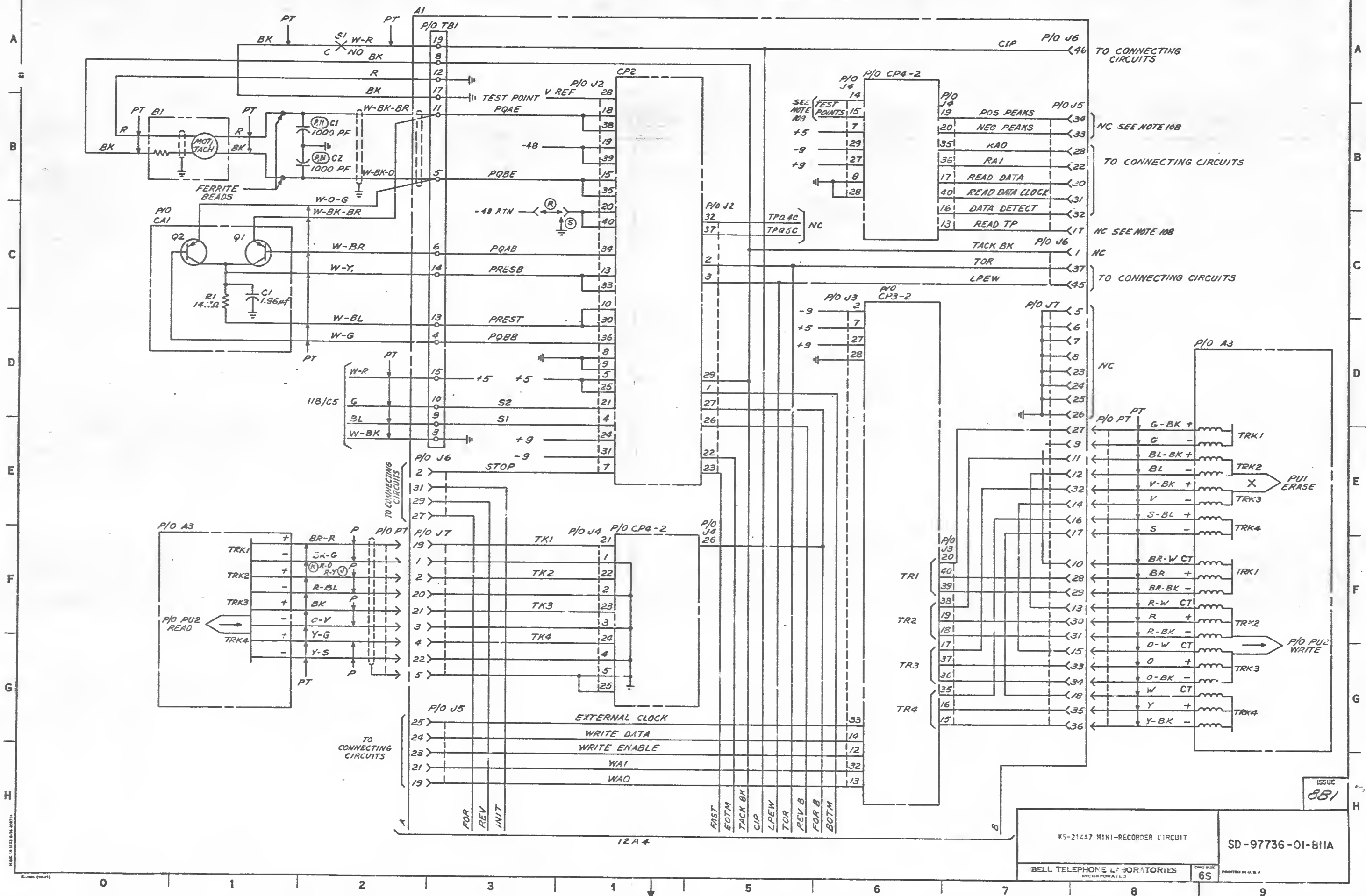
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ISSUE
7A1(C)

PART OF FS 8
INTERNAL CONNECTION OF KS-21447, LIST 5, LIST 6,
AND LIST 10 MINI-RECORDER

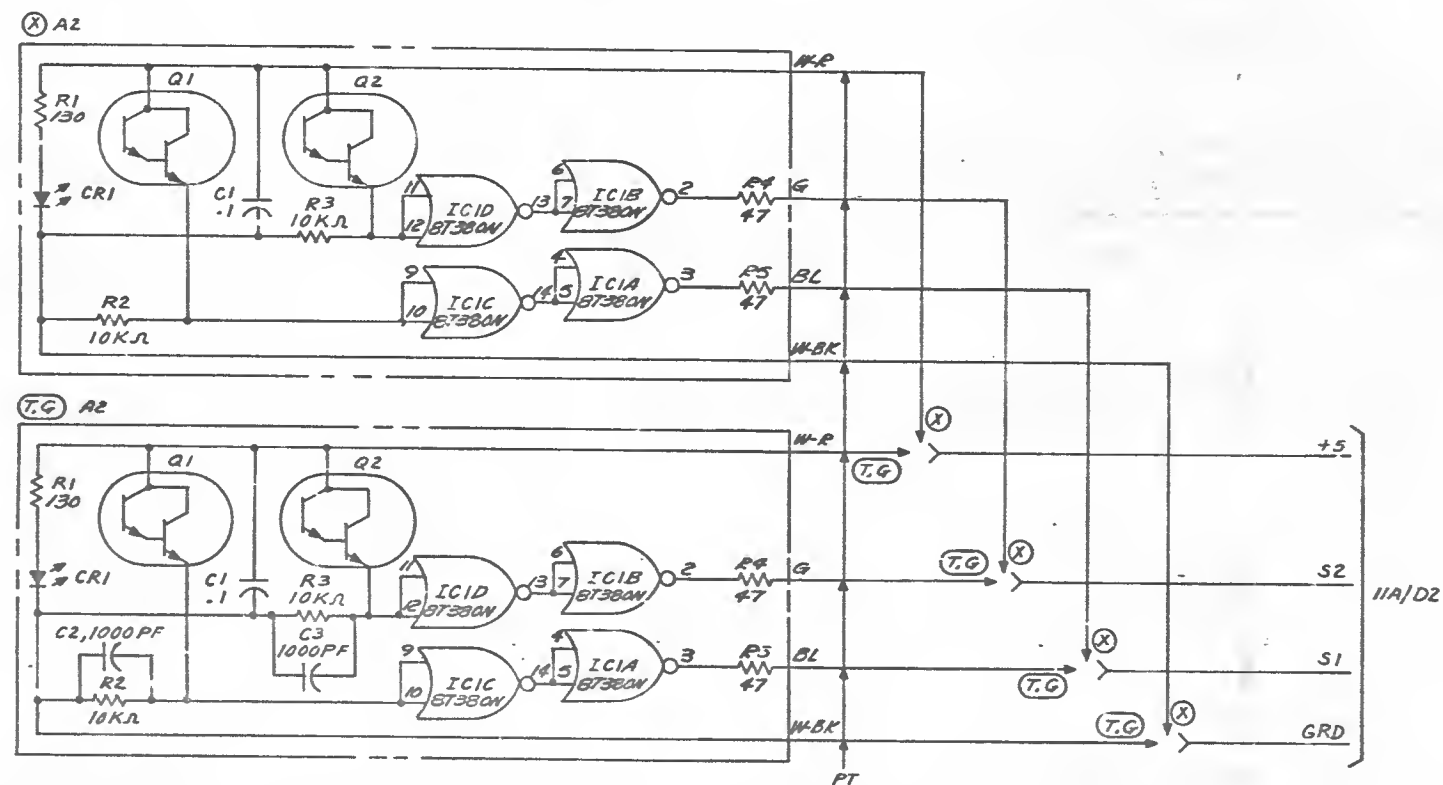


PART OF FS 9 INTERNAL CONNECTION OF THE KS-21447, LIST B MINI-RECORDER



0 1 2 3 4 5 6 7 8 9

PART OF FS 9
INTERNAL CONNECTION OF THE KS-21447 LIST B MINI-RECORDER



KS-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

SD-97736-01-B11B

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ISSUE
7A(6)

10-1100 (10-71)

INTERNAL CONNECTION OF KS-21447, LB
MINI-RECORDER



SD - 97736 - 01 - B12

BELL TELEPHONE LABORATORIES
INCORPORATED

65

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APP FIG. 1 KS-21447, LI MINI-RECORDER

CIRCUIT PACK

EQPT LOC.	DESIG.	CP2	CP4-1	CP5
	CODE	L510100	L510103-1	L510101
OPTION				
ELEM. IDENT.	TERM.	TERM.	TERM.	TERM.
TERM. FS. LOC.	40-1A/D5	40-1A/C7	40-1A/E7	
CONNECTION ON FRAME	J2	J4	J3	
	SEE A1 BACK PLANE ASSEMBLY			

ASSEMBLY, BACK PLANE

DESIG.	LOC.	CODE
A1	1A/A2	L510104-1
	E/W	

CONNECTOR, (JACK)

DESIG.	J2	J3	J4	J5	J6	J7
CODE	90BL	90BL	90BL	KS-16786, L17	KS-16786, L12	KS-16786, L17
OPTION						
TERM.	LOC	LOC	LOC	LOC	LOC	LOC
50						
49						
48						
47						
46						
45						
44						
43						
42						
41						
40	1A/C4	1A/D7	1A/B7			
39	1A/B4	1A/E7				
38	1A/B4	1A/E7				
37						
36	1A/D4		1A/B7			
35	1A/B4		1A/B7			
34	1A/C4					
33	1A/C4	1A/H6				
32		1A/H6				
31	1A/E4					
30	1A/D4					
29	1A/D5		1A/B6			
28	1A/D4	1A/D6	1A/B6			
27	1A/E5	1A/D6	1A/B6			
26	1A/E5	1A/G7				
25	1A/D4	1A/D6	1A/G4	1A/H2	1A/G2	1A/E8
24	1A/E4	1A/E6		1A/H2	1A/G2	1A/F8
23		1A/F6		1A/H2	1A/G2	1A/F8
22	1A/E5	1A/E6	1A/F4	1A/B8	1A/G2	
21	1A/E4	1A/F7	1A/F4	1A/H2	1A/H6	
20	1A/C4	1A/D7	1A/B7	1A/B8	1A/H6	1A/F2
19	1A/B4	1A/E7	1A/B7	1A/H2	1A/H6	1A/F2
18	1A/B4	1A/E7			1A/H6	
17			1A/B7	1A/C8	1A/H6	
16			1A/C7	1A/H4	1A/H6	
15	1A/B4		1A/B6	1A/H4	1A/H6	
14		1A/H6	1A/B6	1A/H4	1A/H6	
13	1A/C4	1A/H6	1A/C7	1A/H4	1A/H5	
12		1A/H6		1A/H4	1A/H5	
11				1A/H4	1A/H5	1A/E8
10	1A/C4			1A/H4	1A/H5	
9	1A/D4			1A/H3	1A/H5	
8	1A/D4	1A/D6	1A/G6	1A/H3	1A/H5	1A/F8
7	1A/E4	1A/D6	1A/B6	1A/H3	1A/H5	1A/E8
6		1A/E6		1A/H3	1A/H5	1A/E8
5	1A/D4	1A/F7	1A/G4	1A/H3	1A/H5	1A/E8
4	1A/D4	1A/E6	1A/F4	1A/H3	1A/H5	
3	1A/C5	1A/E6	1A/F4	1A/H3	1A/H4	
2	1A/C5	1A/D6	1A/F4	1A/H3	1A/E2	1A/F2
1	1A/D5	1A/D6	1A/F4	1A/H3	1A/C8	1A/F2

TERMINAL BOARD

DESIG.	TB1
CODE	*
OPTION	
TERM.	LOC
23	
22	
21	
20	
19	1A/A3
18	
17	1A/B3
16	
15	1A/D3
14	1A/C3
13	1A/D3
12	1A/A3
11	1A/B3
10	1A/E3
9	1A/D3
8	1A/A3
7	
6	1A/C3
5	1A/B3
4	1A/D3
3	1A/E3
2	
1	

* 520-23 KULKA
ELECTRIC CORP.

ASSEMBLY, SENSOR HOUSING

DESIG.	LOC.	CODE
A2	1B/C0	L510114, SPECTRONICS, INC.
	1B/E0	PART NO. ② SPX1820
	1B/A0	① SPX1820A
	1B/F0	③ SPX1820A
	1B/F0	④ SPX1820B
	1B/F0	⑤ SPX1820C. SEE NOTE 205

BEADS, FERRITE

DESIG.	LOC.	CODE
-	1A/B1	2673021801, FAIR-RITE PRODUCTS, INC.

CAPACITOR

DESIG.	LOC.	CODE
C1	1A/B2	② KS-16509, L1, 1000PF
C2	1A/B2	③ KS-20977, L3, 1000PF

COMPONENT ASSEMBLY

DESIG.	LOC.	CODE
C41	1A/C0	L510098

E/W

CAPACITOR

DESIG.	LOC.	CODE
C1	1A/C1	596G, 1.96

RESISTOR

DESIG.	LOC.	CODE
R1	1A/C1	KS-8512, L17A, 14.7

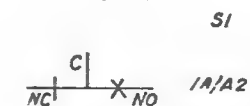
TRANSISTOR

DESIG.	LOC.	CODE
Q1	1A/C1	2N3792
Q2	1A/C1	2N3792

MOTOR ASSEMBLY

DESIG.	LOC.	CODE
B1	1A/B1	L510097, SEE NOTE 206

SWITCH L510093-1



ASSEMBLY, HEAD TWO TRACK

DESIG.	LOC.	CODE
A3	1A/F0, 1A/D9	L510094
	E/W	

CONNECTOR, (PLUG)

DESIG.	P7
CODE	KS-16785, L3
OPTION	
TERM.	LOC
36	
35	
34	
33	
32	
31	1A/E8
30	1A/E8
29	1A/E8
28	1A/E8
27	1A/D8
26	1A/F8
25	1A/F8
24	1A/F8
23	1A/F8
22	
21	
20	1A/F2
19	1A/F2
18	
17	
16	
15	
14	
13	
12	
11	1A/E8
10	
9	
8	1A/F8
7	1A/F8
6	1A/F8
5	1A/F8
4	
3	
2	1A/F2
1	1A/F2

SD-97736-01-C1

KS-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

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SD-97736-01-C1

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APP FIG. 2 KS-21447, L2, L7, AND L9 MINI-RECORDER

CIRCUIT PACK

EQPT. LOC.	DESIG.	LOC.	CODE
DESIG.	CP1-1	CP2	CP3-1
CODE	L510099-1	L510100	L510102-1
OPTION	—	—	LIST 2 & LIST 7
ELEM. IDENT.	TERM	TERM	TERM
TERM FS LOC	40-3A4	40-2A/C4	40-2A/F7
CONNECTION ON FRAME	J1	J2	J3
	SEE A1 BACK PLANE ASSEMBLY		

ASSEMBLY, BACK PLANE

DESIG.	LOC.	CODE
A1	2A/A2	L510104-2

CONNECTOR, (JACK)

DESIG.	J1	J2	J3	J4	J5	J6	J7
CODE	908L	908L	908L	908L	KS-16786, L17	KS-16786, L12	KS-16786, L17
OPTION							
TERM	LOC	LOC	LOC	LOC	LOC	LOC	LOC
50						3G3	
49						3F7	
48						3G3	
47						3B6	
46						2A/A7	
45						2A/C7	
44						3B6	
43						3A6	
42						3B6	
41						3A6	
40	3A4	2A/C4	2A/F6	2A/B6		3C6	
39		2A/B4	2A/F6	3F5		3B6	
38	3B4	2A/B4	2A/F6	3F5		3B6	
37	3B4	2A/B4	2A/G6	3F4		2A/C7	
36	3A5	2A/D4	2A/G6	2A/B6	3F6	3B6	2A/F7
35	3A5	2A/B4	2A/G6	2A/B6	3F6	3B6	2A/F7
34	3B5	2A/C4	3F4		2A/B7	3B6	2A/F7
33	3B5	2A/C4			2A/B7	3C3	2A/ET
32	3B5		2A/H6		2A/C7	3C3	3G6
31	3D4	2A/E4	3G4		2A/B7	2A/E3	2A/ET
30	3C4	2A/D4			2A/B7	3C3	2A/ET
29	3A4	2A/D5		2A/B6		2A/E3	2A/ET
28	3E4	2A/B4	2A/D6	2A/B6		3C3	2A/D7
27	3B4	2A/D5	2A/D6	2A/B6		2A/E3	3G6
26	3B4	2A/E5				3C3	2A/E9
25	3D4	2A/D4		2A/G4		3H3	2A/G9
24	3D4	2A/E4		2A/G4	2A/H3	3G3	2A/G9
23	3B4	2A/E5		2A/G4	2A/H3	3H3	2A/G9
22	3B4	2A/E5		2A/F4	2A/B7	3H3	2A/G3
21		2A/E4		2A/F4	2A/H3	3H6	2A/F3
20	2A/D5	2A/C4	2A/F6	2A/B6		3H6	2A/F3
19	3B5	2A/B4	2A/F6	2A/B6	2A/H3	3H6	2A/F3
18	3B4	2A/B4	2A/F6	3A6	3F6	3H6	2A/F7
17	3C4		2A/G6	2A/B6	2A/C7	3H6	3H6
16	3C4		2A/G6	2A/C6	3H4	3H6	3G6
15	3E4	2A/B4	2A/G6	2A/B6	3H4	3H6	2A/ET
14	3C5		2A/H6	2A/B6	3H4	3H6	3G6
13	3B5	2A/C4	2A/H6	2A/C6	3H4	3H6	2A/ET
12	3C4		2A/H6		3H4	3F6	3G6
11	3B5		3G4		3H4	3H5	3G6
10	3E4	2A/D4			3H4	3H5	2A/D7
9	3D5	2A/D4			3H3	3H5	3F6
8	3D4	2A/D4	2A/D6	2A/B7	3H3	3H5	2A/G9
7	3C4	2A/E4	2A/D6	2A/B6	3H3	3H5	2A/G9
6	3A4	2A/D4			3H3	3H5	2A/G9
5	3D4	2A/D4		2A/G4	3H3	3H5	2A/G3
4	3A5	2A/D4		2A/G4	3H3	3H5	2A/G3
3	3C4	2A/C5		2A/G4	3H3	3H5	2A/F3
2	3A5	2A/C5	2A/C6	2A/F4	3H3	2A/E3	2A/F3
1	3B4	2A/D5		2A/F4	3H3	2A/C7	2A/F3

TERMINAL BOARD

DESIG.	TB1
CODE	*
OPTION	
TERM	LOC
23	3G3
22	3F7
21	3F9
20	3F3
19	2A/A3
18	3F3
17	2A/B3
16	3F3
15	2A/D3
14	2A/C3
13	2A/D3
12	2A/A3
11	2A/B3
10	2A/E3
9	2A/D3
8	2A/A3
7	3E3
6	2A/C3
5	2A/B3
4	2A/D3
3	2A/E3, 3E2
2	3D3
1	3D3

* 520-23 KULKA ELECTRIC CORP.

ASSEMBLY, SENSOR HOUSING

DESIG.	LOC.	CODE
A2	2B/C0	L510114, SPECTRONICS INC.
	2B/D0	PART NO. ② SPX1820
	2B/A0	③ SPX1820M
	2B/F0	④ SPX1820A
	2B/F0	⑤ SPX1820B
	2B/F0	⑥ SPX1820C

COMPONENT ASSEMBLY

DESIG.	LOC.	CODE
CA1	2A/C0	L510098
E/W		
CAPACITOR		
DESIG.	LOC.	CODE
C1	2A/C1	5963, 1.96
DIODE		
DESIG.	LOC.	CODE
CR1	3D0	UZ 709 UNITRODE CORP
CR2	3D0	UZ 709 UNITRODE CORP
RESISTOR		
DESIG.	LOC.	CODE
R1	2A/C1	KS-8512, L17A, 14.7
R2	3F1	RH10, 50 DALE ELECTRONIC CORP
R3	3E1	RH10, 200
TRANSISTOR		
DESIG.	LOC.	CODE
Q1	2A/C1	2N3792
Q2	2A/C1	2N3792

ASSEMBLY, HEAD FOUR TRACK

DESIG.	LOC.	CODE
A3	3F8, 2D8, 2F0	L510095

CONNECTOR, (PLUG)

DESIG.	P7
CODE	KS-16785, L3
OPTION	
TERM	LOC.
36	2A/G3
35	2A/G8
34	2A/G8
33	2A/G8
32	2A/E8
31	2A/F8
30	2A/F8
29	2A/F8
28	2A/F8
27	2A/D8
26	2A/D8
25	2A/D8
24	2A/D8
23	2A/D8
22	2A/G2
21	2A/F2
20	2A/F2
19	2A/F2
18	2A/G8
17	2A/E8
16	2A/E8
15	2A/G8
14	2A/E8
13	2A/F8
12	2A/E8
11	2A/E8
10	2A/F8
9	2A/D8
8	2A/D8
7	2A/D8
6	2A/D8
5	2A/G2
4	2A/G2
3	2A/F2
2	2A/F2
1	2A/F2

COMPONENT ASSEMBLY

DESIG.	LOC.	CODE
CA1	2A/E0	L-515000-1
E/W		
CAPACITOR		
DESIG.	LOC.	CODE
C1	2A/C1	5966, 1.96
DIODE		
DESIG.	LOC.	CODE
CR1	3F0	458C
CR2	3F0	444X 808F
CR3	3E0	458C
CR4	3E0	444X 808F
RESISTOR		
DESIG.	LOC.	CODE
R1	2A/C1	KS-8512, L17A, 14.7
R2	3F1	KS-16645, L1.3
R3	3E0	KS-20289, L6A, 3.3K
R4	3E0	KS-20289, L6C, 3.32K
R5	3E1	KS-16645, L1, 3
R5	3F0	KS-20810, L1A, 1K
TRANSISTOR		
DESIG.	LOC.	CODE
Q1	2A/C1	2N3792
Q2	2A/C1	2N3792
Q3	3E1	2N5680
Q4	3F1	2N5651

MOTOR

DESIG.	LOC.	CODE
B1	2A/B1	L510097, SEE NOTE 204 AND 206

SWITCH

DESIG.	LOC.	CODE
L510093-2		
	S1	S2
NC	2A/A2	362
	NO	

SWITCH ASSEMBLY

DESIG.	LOC.	CODE
S3, S4	3D1	L510107

BEADS, FERRITE

DESIG.	LOC.	CODE
	2A/B1	2679021801, FAIR-RITE PRODUCTS INC.

CAPACITOR

DESIG.	LOC.	CODE
C1	2A/B2	① KS-16509, L1, 1000 PF
C2	2A/B2	② KS-20977, L3, 1000 PF

KS-21447 MINI-RECORDER CIRCUIT

SD-97736-01-C2

BELL TELEPHONE LABORATORIES

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PRINTED IN U.S.A.

APP FIG.3
KS-21447, LIST 3 AND LIST 4, MINI-RECORDER

CIRCUIT PACK

EQPT. LOC.							
DESIG	CPI-1		CP2		CP3-2		CP4-2
CODE	L-510099-1		L-510100		L-510102-2		L-510103-3
OPTION							
ELEM IDENT.	TERM		TERM		TERM		TERM
TERM FS LOC	40-8A4		40-7A/C4		40-7A/F7		40-7A/B7
CONNECTION ON FRAME	J1		J2		J3		J4
	SEE A1 BACK PLANE ASSEMBLY						

ASSEMBLY, BACK PLANE

DESIG	LOC	CODE
A1	7A/A2	L-510104-2
	E/W	

CONNECTOR, (JACK)

DESIG	J1	J2	J3	J4	J5	J6	J7
CODE	908L	908L	908L	908L	KS-16786, L17	KS-16786, L17	KS-16786, L17
OPTION							
TERM	LOC	LOC	LOC	LOC	LOC	LOC	LOC
50						8G3	
49						8F7	
48						8G3	
47						8B6	
46						7A/A7	
45						7A/C7	
44						8B6	
43						8A6	
42						8B6	
41						8A6	
40	8A4	7A/C4	7A/F6	7A/B6		8C6	
39		7A/B4	7A/F6	8F5		8B6	
38	8B4	7A/B4	7A/F6	8F5		8B6	
37	8B4	7A/G6	8F4			7A/C7	
36	8A5	7A/D4	7A/G6	7A/B6	8F6	8B6	7A/G7
35	8A5	7A/B4	7A/G6	7A/B6	8F6	8B6	7A/G7
34	8B5	7A/C4	8F4		7A/B7	8B6	7A/G7
33	8B5	7A/C4	9G3		7A/B7	8C3	7A/G7
32	8B5		7A/H6		7A/C7	8C3	7A/E7
31	8D4	7A/E4	8G4		7A/B7	7A/E3	7A/F7
30	8C4	7A/D4			7A/B7	8C3	7A/F7
29	8A4	7A/D5		7A/B6		8C3	7A/F7
28	8E4	7A/B4	7A/D6	7A/B6		8C3	7A/F7
27	8B4	7A/D5	7A/D6	7A/B6		7A/E3	7A/E7
26	8B4	7A/E5				8C3	
25	8D4	7A/D4		7A/G4		8H3	
24	8D4	7A/E4		7A/G4	7A/H3	8H3	
23	8B4	7A/E5		7A/F4	7A/H3	8H3	7A/G3
22	8B4	7A/E5		7A/F4	7A/B7	8H3	7A/F3
21		7A/E4		7A/F4	7A/H3	8H6	7A/F3
20	8D5	7A/C4	7A/F6	7A/B6		8H6	7A/F3
19	8B5	7A/B4	7A/F6	7A/B6	7A/H3	8H6	7A/F3
18	8B4	7A/B4	7A/F6	8AF	8F6	8H6	7A/F7
17	8C4		7A/G6	7A/B6	7A/C7	8H6	7A/E7
16	8C4		7A/G6	7A/C6	8H4	8H6	7A/E7
15	8E4	7A/B4	7A/G6	7A/B6	8H4	8H6	7A/G7
14	8C5		7A/H6	7A/B6	8H4	8H6	7A/E7
13	8B5	7A/C4	7A/H6	7A/C6	8H4	8H6	7A/F7
12	8C4		7A/H6		8H4	8F6	7A/E7
11	8B5		8G4		8H4	8H5	7A/E7
10	8E4	7A/D4			8H4	8H5	7A/F7
9	8D5	7A/D4			8H3	8H5	7A/E7
8	8D4	9G6		7A/B7	8H3	8H5	
7	8C4	7A/E4	7A/D6	7A/B6	8H3	8H5	
6	8A4	7A/D4			8H3	8H5	
5	8D4	7A/D4		7A/G4	8H3	8H5	7A/G3
4	8A5	7A/D4		7A/G4	8H3	8H5	7A/G3
3	8C4	7A/C5		7A/G4	8H3	8H5	7A/F3
2	8A5	7A/C5	7A/CC	7A/F4	8H3	7A/E3	7A/F3
1	8B4	7A/D5		7A/F4	8H3	7A/C7	7A/F3

TERMINAL BOARD

DESIG	TERM	LOC
CODE		*
OPTION		
TERM		LOC
23		8G3
22		
21		
20		
19		7A/A3
18		8F3
17		7A/B3
16		
15		7A/D3
14		7A/C3
13		7A/D3
12		7A/A3
11		7A/B3
10		7A/E3
9		7A/D3
8		7A/A3
7		
6		7A/C3
5		7A/B3
4		7A/D3
3		7A/E3, 3E3
2		8E3
1		8D3

* S20-23 KULKA
ELECTRIC CORP.

ASSEMBLY, SENSOR HOUSING

DESIG.	LOC	CODE
A2	7B/C0	L-510114, SPECTRONICS INC. PART NO. ② SPX1820
	7B/A0	① SPX1820A
	7B/E0	⑦ SPX1820B
	7B/E0	⑥ SPX1820C

BEADS, FERRITE

DESIG	LOC	CODE
-	7A/B1	2673021801, FAIR-RITE PRODUCTS, INC.

CAPACITOR

DESIG	LOC	CODE
C1	7A/B2	① KS-16509, L1, 1000PF
C2	7A/B2	② KS-20977, L3, 1000PF

COMPONENT ASSEMBLY

DESIG	LOC	CODE
CA1	7A/C0	L-510098

CAPACITOR

DESIG	LOC	CODE
C1	7A/D1	596G, 1.96

RESISTOR

DESIG	LOC	CODE
R1	7A/D1	KS-8512, L17A, 14.7

TRANSISTOR

DESIG	LOC	CODE
Q1	7A/C1	2N3792
Q2	7A/C1	2N3792

MOTOR

DESIG	LOC	CODE
B1	7A/B1	L-510097, SEE NOTE 206

SWITCH

L-510093-2

	S1	S2
N2	X _{NO}	9A/A2 10G2

SWITCH ASSEMBLY

DESIG.	LOC	CODE
S3, S4	10D1	L-510107

ISSUE

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KS-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

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SD-97736-01-C3

SD-97736-01-C3

APP FIG. 4

KS-21447 LIST 5, LIST 6 AND LIST 10 MINI-RECORDER

CIRCUIT PACK

EOPT. LOC.	CP1-1	CP2	CP3-2	CP4-2	CP4-3	CP4-4
DESIG	CP1-1	CP2	CP3-2	CP4-2	CP4-3	CP4-4
CODE	L-510099-1	L-510100	L-510102-2	L-510103-2	L-510103-3	L-510103-4
OPTION	-	-	-	LIST 5	LIST 6	LIST 10
ELEM. IDENT.	TERM	TERM	TERM	TERM	TERM	TERM
TERM FS LOC	40-10A4	40-9A/C4	40-9A/E6, 10G5	40-9A/F4, 9A/B6, 10F5	40-9A/F4, 9A/B6, 10F5	40-9A/F4, 9A/B6, 10F5
CONNECTION ON FRAME	J1	J2	J3	J4		
	SEE A1 BACK PLANE ASSEMBLY					

ASSEMBLY, BACK PLANE

DESIG	LOC	CODE
A1	9A/A2	L-510104

CONNECTOR, (JACK)

DESIG	J1	J2	J3	J4	J5	J6	J7
CODE	908L	908L	908L	908L	KS-16786, L17	KS-16786, L12	KS-16786, L17
OPTION							
TERM	LOC	LOC	LOC	LOC	LOC	LOC	LOC
50						10G3	
49							
48						10G3	
47						10B6	
46						9A/A7	
45						9A/C7	
44						10B6	
43						10A6	
42						10B6	
41						10A6	
40	10A4	9A/C4	9A/F6	9A/B6		10C6	
39		9A/B4	9A/F6	10F5		10B6	
38	10B4	9A/B4	9A/F6	10F5		10B6	
37	10B4		9A/C7	10F4		C7	
36	10A5	9A/D4	9A/G6	9A/B6	10F6	10B6	9A/G7
35	10A5	9A/B4	9A/G6	9A/B6	10F6	10B6	9A/G7
34	10B5	9A/C4	10F4		9A/B7	10B6	9A/G7
33	10B5	9A/C4	9A/G3		9A/B7	10C3	9A/G7
32	10B5		9A/H6		9A/C7	10C3	9A/E7
31	10D4	9A/E4	10G4		9A/B7	9A/E3	9A/F7
30	10C4	9A/D4			9A/B7	10C3	9A/F7
29	10C4	9A/D5		9A/B6		9A/E3	9A/F7
28	10E4	9A/B4	9A/D6	9A/B6		10C3	9A/F7
27	10B4	9A/D5	9A/D6	9A/B6		E3	9A/E7
26	10B4	9A/E5				10C3	
25	10D4	9A/D4		9A/G4		10H3	
24	10D4	9A/E4		9A/G4	9A/H3	10G3	
23	10B4	9A/E5		9A/F4	9A/H3	10H3	
22	10B4	9A/E5		9A/F4	9A/B7	10H3	9A/G3
21		9A/E4		9A/F4	9A/H3	10H6	9A/F3
20	10D5	9A/C4	9A/F6	9A/B6	9A/H3	10H6	9A/F3
19	10B5	9A/B4	9A/F6	9A/B6	9A/H3	10H6	9A/F3
18	10B4	9A/B4	9A/F6	10A5	10F6	10H6	9A/F7
17	10C4		9A/G6	9A/B6	9A/C7	10H6	9A/E7
16	10C4		9A/G6	9A/C6	10H4	10H6	9A/E7
15	10E4	9A/B4	9A/G6	9A/B6	10H4	10H6	9A/G7
14	10C5		9A/H6	9A/B6	10H4	10H6	9A/E7
13	10B5	9A/C4	9A/H6	9A/C6	10H4	10H6	9A/F7
12	10C4		9A/H6	9A/G5	10H4	10F6	9A/E7
11	10B5		10G4		10H4	10H5	9A/E7
10	10E4	9A/D4			10H4	10H5	9A/F7
9	10D5	9A/D4			10H3	10H5	9A/E7
8	10D4	9A/D4	9A/G6	9A/B7	10H3	10H5	
7	10C4	9A/E4	9A/D6	9A/B6	10H3	10H5	
6	10A4	9A/L4			10H3	10H5	
5	10C4	9A/D4		9A/G4	10H3	10H5	9A/G3
4	10E5	9A/D4		9A/G4	10H3	10H5	9A/G3
3	10C4	9A/C5		9A/G4	10H3	10H5	9A/F3
2	10A5	9A/C5	9A/C6	9A/F4	10H3	9A/E3	9A/F3
1	10B4	9A/O5		9A/F4	10H3	9A/C7	9A/F3

TERMINAL BOARD

DESIG	TB1
CODE	*
OPTION	
TERM	LOC
23	10G3
22	10E3
21	10E3
20	
19	9A/A3
18	10F3
17	9A/B3
16	
15	9A/D3
14	9A/C3
13	9A/D3
12	9A/A3
11	9A/B3
10	9A/E3
9	9A/D3
8	9A/A3
7	10E3
6	9A/C3
5	9A/B3
4	9A/D3
	9A/E3, 4E2
2	10E3
1	10D3

* 520-23 KULKA ELECTRIC CORP.

ASSEMBLY, SENSOR HOUSING

DESIG	LOC	CODE
A2	9B/C0	L-510114, SPECTRONICS INC. PART NO. ② SPX1820
	9B/E0	③ SPX1820H
	9B/A0	④ SPX1820A
	9B/F0	⑤ SPX1820B
	9B/F0	⑥ SPX1820C

ASSEMBLY, HEAD FOUR TRACK

DESIG	LOC	CODE
A3	9A/F0, 9A/D8	L-510095

CONNECTOR (PLUG)

DESIG	P7
CODE	KS-16785, L3
OPTION	
TERM	LOC
36	9A/G8
35	9A/G8
34	9A/G8
33	9A/G8
32	9A/E8
31	9A/F8
30	9A/F8
29	9A/F8
28	9A/F8
27	9A/E8
26	9A/D8
25	9A/D8
24	9A/D8
23	9A/D8
22	9A/G2
21	9A/F2
20	9A/F2
19	9A/F2
18	9A/G8
17	9A/E8
16	9A/E8
15	9A/G8
14	9A/E8
13	9A/F8
12	9A/E8
11	9A/E8
10	9A/F8
9	9A/E8
8	9A/D8
7	9A/D8
6	9A/D8
5	9A/F2
4	9A/F2
3	9A/F2
2	9A/F2
1	9A/F2

BEADS, FERRITE

DESIG	LOC	CODE
	9A/B1	2673021801, FAIR-RITE PRODUCTS, INC.

CAPACITOR

DESIG	LOC	CODE
C1	9A/B2	① KS-16509, L1, 1000pF
C2	9A/B2	② KS-20977, L3, 1000pF

COMPONENT ASSEMBLY

DESIG	LOC	CODE
CA1	9A/C0, 10E0	L-510098-3

CAPACITOR

DESIG	LOC	CODE
C1	9A/C1	596G, 1.96

DIODE

DESIG	LOC	CODE
CR2	10D0	UZ709 UNITRODE CORP.

RESISTOR

DESIG	LOC	CODE
R1	9A/C1	KS-8512, L17A, 14.7
R3	10D0	RH-200 DALE ELECTRONICS

TRANSISTOR

DESIG	LOC	CODE
Q1	9A/C1	2N3792
Q2	9A/C1	2N3792

COMPONENT ASSEMBLY

DESIG	LOC	CODE
CA1	9A/C0, 10E0	L-510000-2

CAPACITOR

DESIG	LOC	CODE
C1	9A/C1	596G, 1.96

DIODE

DESIG	LOC	CODE
CR3	10E0	458C
CR4	10E0	446+ 808F

RESISTOR

DESIG	LOC	CODE
R1	9A/C1	KS-8512, L17A, 14.7
R2	10C1	KS-16645, L1, 3
R3	10E0	KS-20289, L6A, 3.3K
R3	10E0	KS-20289, L6C, 3.32K

TRANSISTOR

DESIG	LOC	CODE
Q1	9A/C1	2N3792
Q2	9A/C1	2N3792
Q3	10E0	2N5680

MOTOR

DESIG	LOC	CODE
B1	9A/B1	L-510097, SEE NOTE 206

SWITCH

DESIG	LOC	CODE
S1	9A/A2	10G7
S2		

SWITCH ASSEMBLY

DESIG	LOC	CODE
S3, S4	10D1	L-510107

KS-21447 MINI-RECORDER CIRCUIT

SD-97736-01-C4

BELL TELEPHONE LABORATORIES

6S

ISSUED BY U.S.A.

APP FIG. 5

KS-21447, LIST 8 MINI-RECORDER

CIRCUIT PACK

EQPT. LDC.	DESIG	LOC	CODE
DESIG	CP1-2	CP2	CP3-2
CODE	L-510099-2	L-510100	L-510102-2
OPTION	-	-	-
ELEM. IDENT.	TERM	TERM	TERM
TERM FS LDC	40-12A4	40-11A/C4	40-11A/F6, 12G5
CONNECTION	J1	J2	J3
DN FRAME	SEE A1 BACK PLANE ASSEMBLY	J4	

ASSEMBLY, BACK PLANE

DESIG	LOC	CODE
A1	11A/A2	L-510104-2

CONNECTOR, (JACK)

DESIG	J1	J2	J3	J4	J5	J6	J7
CODE	908L	908L	908L	908L	KS-16786, L17	KS-16786, L12	KS-16786, L17
OPTION							
TERM	LDC	LDC	LDC	LDC	LDC	LDC	LDC
50						12G3	
49							
48						12G3	
47						12B6	
46						11A/A7	
45						11A/C7	
44						12B6	
43						12A6	
42						12B6	
41						12A6	
40	12A4	11A/C4	11A/F6	11A/B6		12C6	
39		11A/B4	11A/F6	12F5		12B6	
38	12B4	11A/B4	11A/F6	12F5		12B6	
37	12B4	11A/G6	12F4		11A/C7		
36	12A5	11A/D4	11A/G6	11A/B6	12F6	12B6	11A/G7
35	12A5	11A/B4	11A/G6	11A/B6	12F6	12B6	11A/G7
34	12B5	11A/C4	12F4		11A/B7	12B6	11A/G7
33	12B5	11A/C4			11A/B		11A/G7
32	12B5		11A/H6		11A/C7		11A/E7
31	12D4	11A/E4	12G4		11A/B7	11A/E3	11A/F7
30	12C4	11A/D4			11A/B7	12C3	11A/F7
29	12A4	11A/D5		11A/B6		11A/E3	11A/F7
28	12E4	11A/B4	11A/C6	11A/B6		12C3	11A/F7
27	12B4	11A/D5	11A/D6	11A/B6		11A/E3	11A/E7
26	12B4	11A/E5				12C3	
25	12D4	11A/D4		11A/G4		12H3	
24	12D4	11A/E4		11A/G4	11A/H3	12G3	
23	12B4	11A/E5		11A/F4	11A/H3	12H3	
22	12B4	11A/E5		11A/F4	11A/B7	12H3	11A/G3
21		11A/E4		11A/F4	11A/H3	12H6	11A/F3
20	12D5	11A/C4	11A/F6	11A/B6	11A/H3	12H6	11A/F3
19	12B5	11A/B4	11A/F6	11A/B6	11A/H3	12H6	11A/F3
18	12B4	11A/B4	11A/F6	12A6	12F6	12H6	11A/F7
17	12C4		11A/G6	11A/B6	11A/C7	12H6	11A/E7
16	12C4		11A/G6	11A/C6	12H4	12H6	11A/E7
15	12E4	11A/B4	11A/G6	11A/B6	12H4	12H6	11A/G7
14	12C5		11A/H6	11A/B6	12H4	12H6	11A/E7
13	12B5	11A/C4	11A/H6	11A/C6	12H4	12H6	11A/F7
12	12C4		11A/H6		12H4	12F6	11A/E7
11	12B5		12G4		12H4	12H5	11A/E7
10	12E4	11A/D4			12H4	12H5	11A/F7
9	12D5	11A/D4			12H3	12H5	11A/E7
8	12D4	11A/D4		11A/B7	12H3	12H5	
7	12C4	11A/E4	11A/D6	11A/B6	12H3	12H5	
6	12A4	11A/D4			12H3	12H5	
5	12D4	11A/D4		11A/G4	12H3	12H5	11A/G3
4	12A5	11A/D4		11A/G4	12H3	12H5	11A/G3
3	12C4	11A/C5		11A/G4	12H3	12H5	11A/F3
2	12A5	11A/C5	11A/C6		12H3	11A/E3	11A/F3
1	12B4	11A/D5		11A/F4	12H3	11A/C7	11A/F3

TERMINAL BOARD

DESIG	TR1
CODE	*
OPTION	
TERM	LDC
23	12G3
22	12E3
21	
20	12F3
19	11A/A3
18	12F3
17	11A/B3
16	12F3
15	11A/D3
14	11A/C3
13	11A/D3
12	11A/A3
11	11A/B3
10	11A/E3
9	11A/D3
8	11A/A3
7	
6	11A/C3
5	11A/B3
4	11A/D3
3	11A/E3
2	12E3
1	12D3

* 520-23 KULKA
ELECTRIC CORP.

ASSEMBLY, SENSOR HOUSING

DESIG	LOC	CODE
A2	11B/A0	L-510114, SPECTRONICS INC. PART NO. X SPX1820A
	11B/C0	(I) SPX1820B
	11B/C0	(G) SPX1820C

BEADS, FERRITE

DESIG	LOC	CODE
-	11A/B1	2673D21801, FAIR-RITE PRODUCTS, INC.

CAPACITOR

DESIG	LOC	CODE
C1	11A/B2	(P) KS-16509, L1, 1000pF
C2	11A/B2	(N) KS-20977, L3, 1000pF

COMPONENT ASSEMBLY

DESIG	LOC	CODE
CA1	11A/C0	L-515000-3

ASSEMBLY, HEAD FOUR TRACK

DESIG	LOC	CODE
A3	11A/D8, 11A/F1	L-510095

CONNECTOR, (PLUG)

DESIG	P7
CODE	KS-16785, L3
OPTION	
TERM	LDC
36	11A/G8
35	11A/G8
34	11A/G8
33	11A/G8
32	11A/E8
31	11A/F8
30	11A/F8
29	11A/F8
28	11A/F8
27	11A/E8
26	11A/D3
25	11A/D5
24	11A/D8
23	11A/D8
22	11A/G2
21	11A/F2
20	11A/F2
19	11A/F2
18	11A/G8
17	11A/E8
16	11A/E8
15	11A/G8
14	11A/E8
13	11A/F8
12	11A/E8
11	11A/E8
10	11A/F8
9	11A/E8
8	11A/D8
7	11A/D8
6	11A/D8
5	11A/G2
4	11A/G2
3	11A/F2
2	11A/F2
1	11A/F2

CAPACITOR

DESIG	LOC	CODE
C1	11A/C1	596G, 1.96

DIPDDE

DESIG	LOC	CODE
CR1	12F1	458C
CR2	12F1	446+ 808F
CR3	12F0	458C
CR4	12F0	446+ 808F

RESISTOR

DESIG	LOC	CODE
R1	11A/C1	KS-8512, L17A, 14.7
R2	12F1	KS-16645, L1, 3
R3	12E0	KS-20289, L6A, 3.3KΩ
R4	12E0	KS-20289, L6C, 3.32KΩ
R5	12E0	KS-16645, L1, 3
R6	12F1	KS-20810, L1A, 1G

TRANSISTOR

DESIG	LOC	CODE
[2] Q1, Q2	11A/C1	2N3792
Q3	12E0	2N5680
Q4	12F1	2N5681

MOTOR

DESIG	LOC	CODE
81	11A/B1	L-510097, SEE NOTE 206

SWITCH

L-510093-1	
NC	NO
	71/A2

KS-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

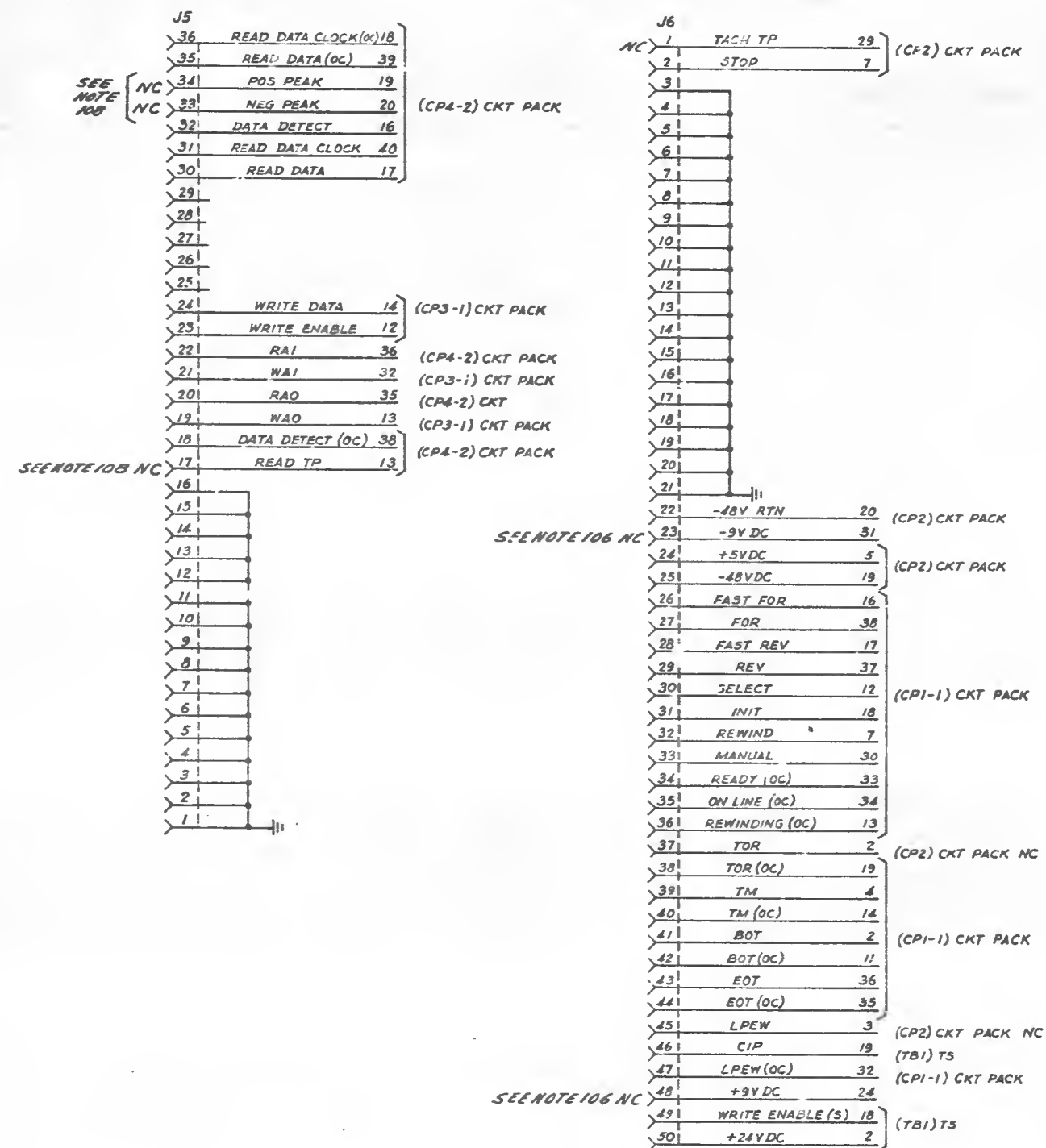
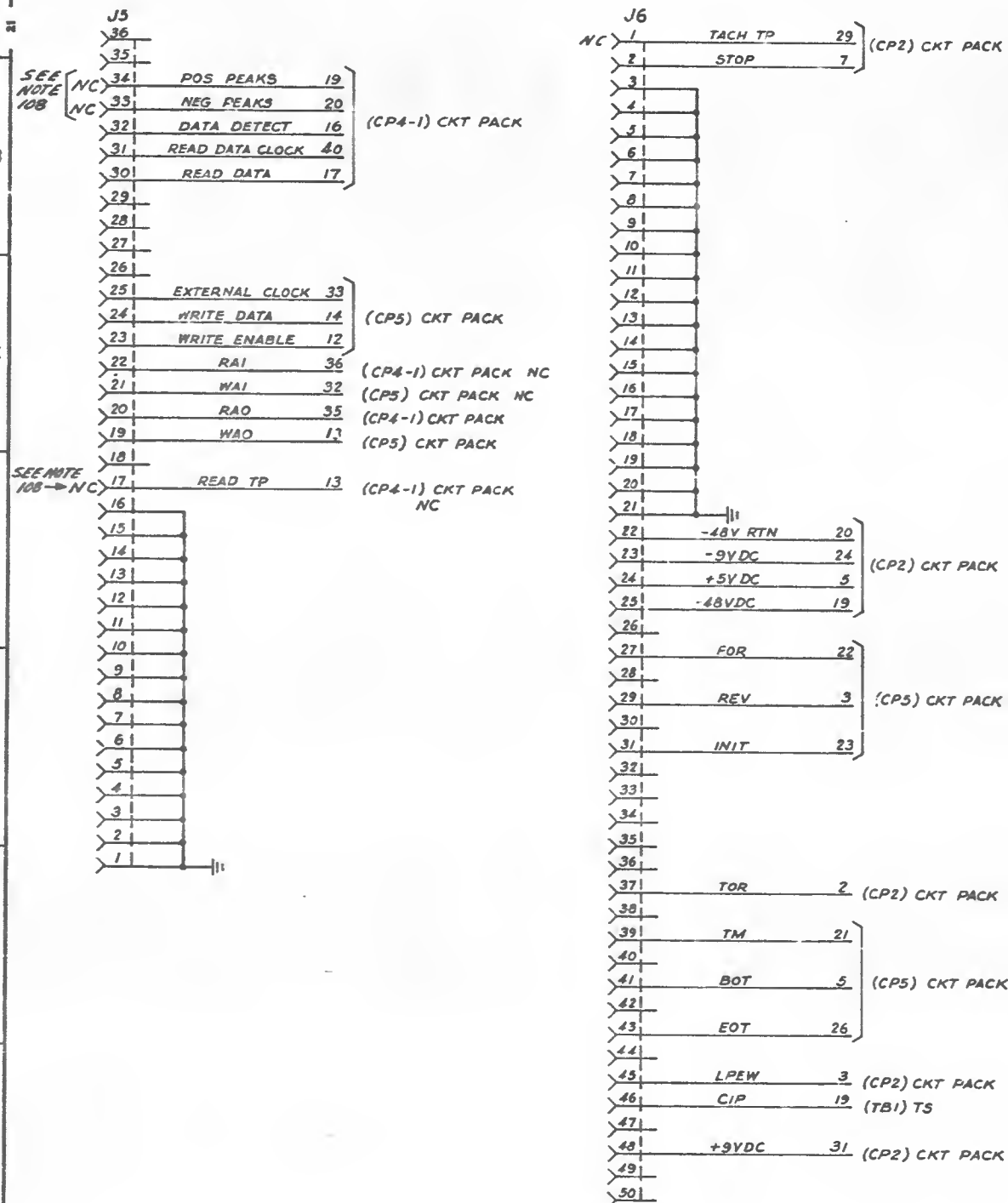
6S

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CAD 1 OUTPUT CONNECTIONS AVAILABLE FOR KS-21447, LIST 1 MINI-RECORDER

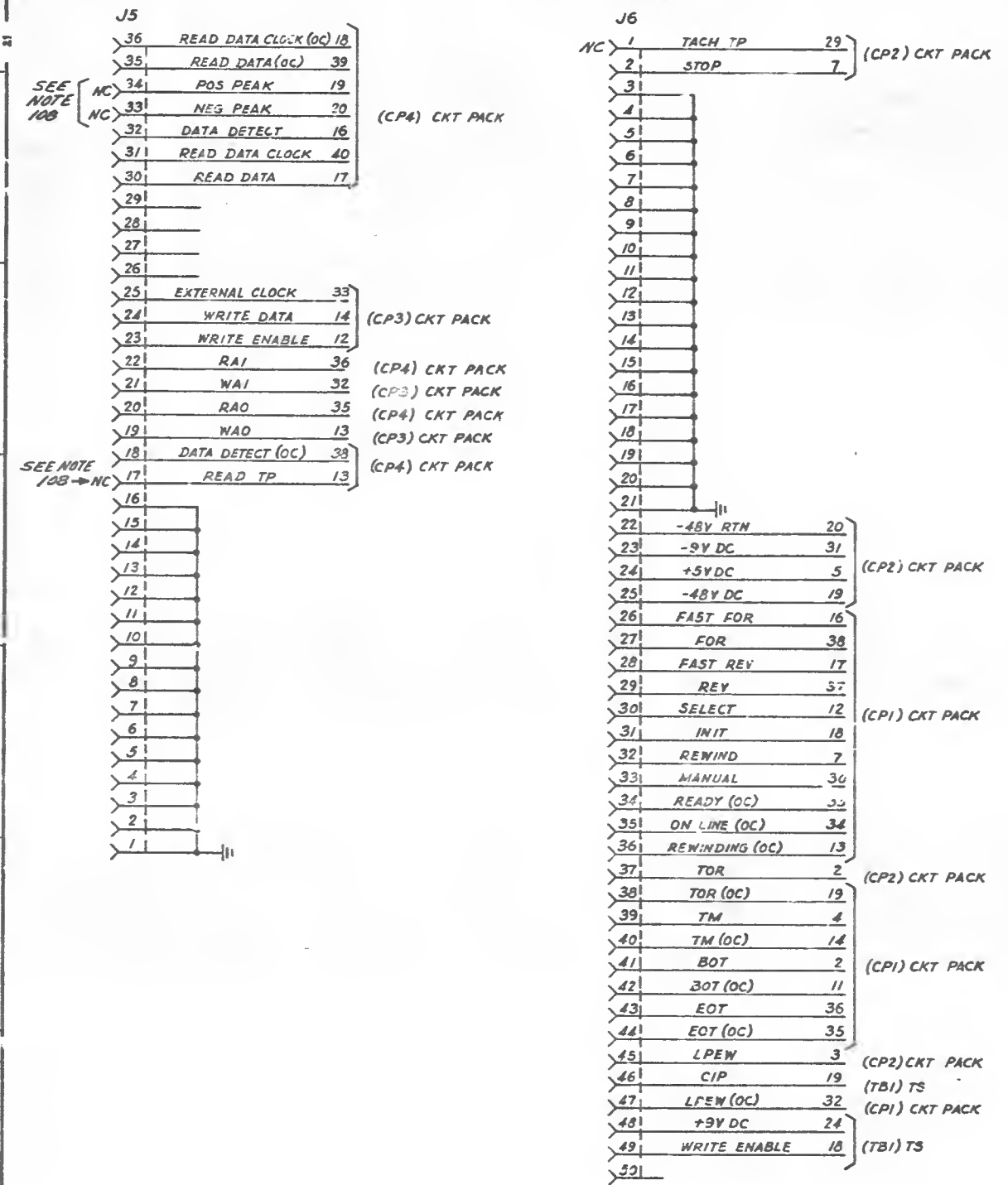
CAD 2 OUTPUT CONNECTIONS AVAILABLE FOR KS-21447 LIST 2, LIST 7, AND LIST 9 MINI-RECORDER



SD-97736-01-G1

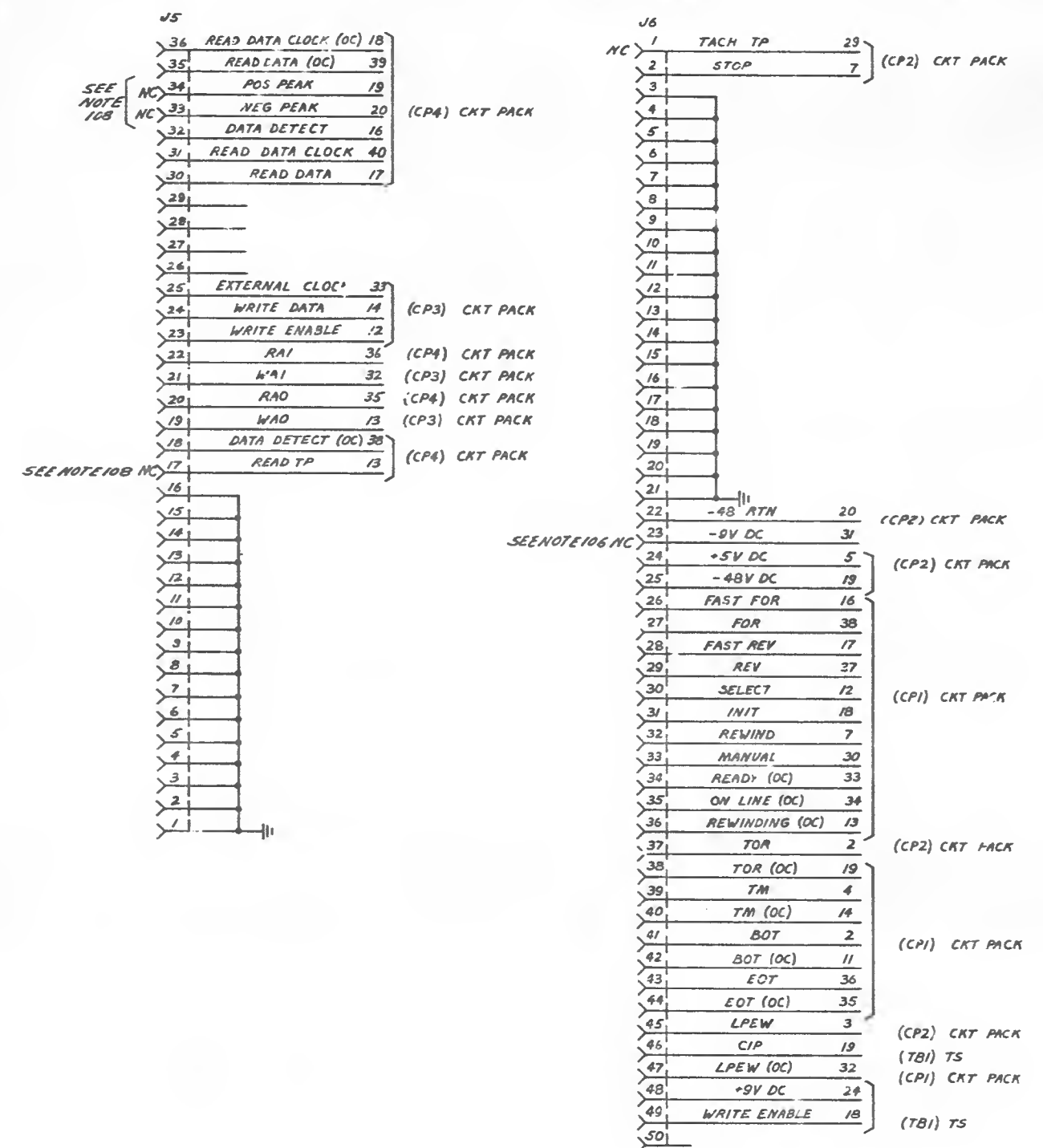
CAD 3

OUTPUT CONNECTIONS AVAILABLE FOR KS-21447, LIST 3 AND 4
MINI-RECORDER

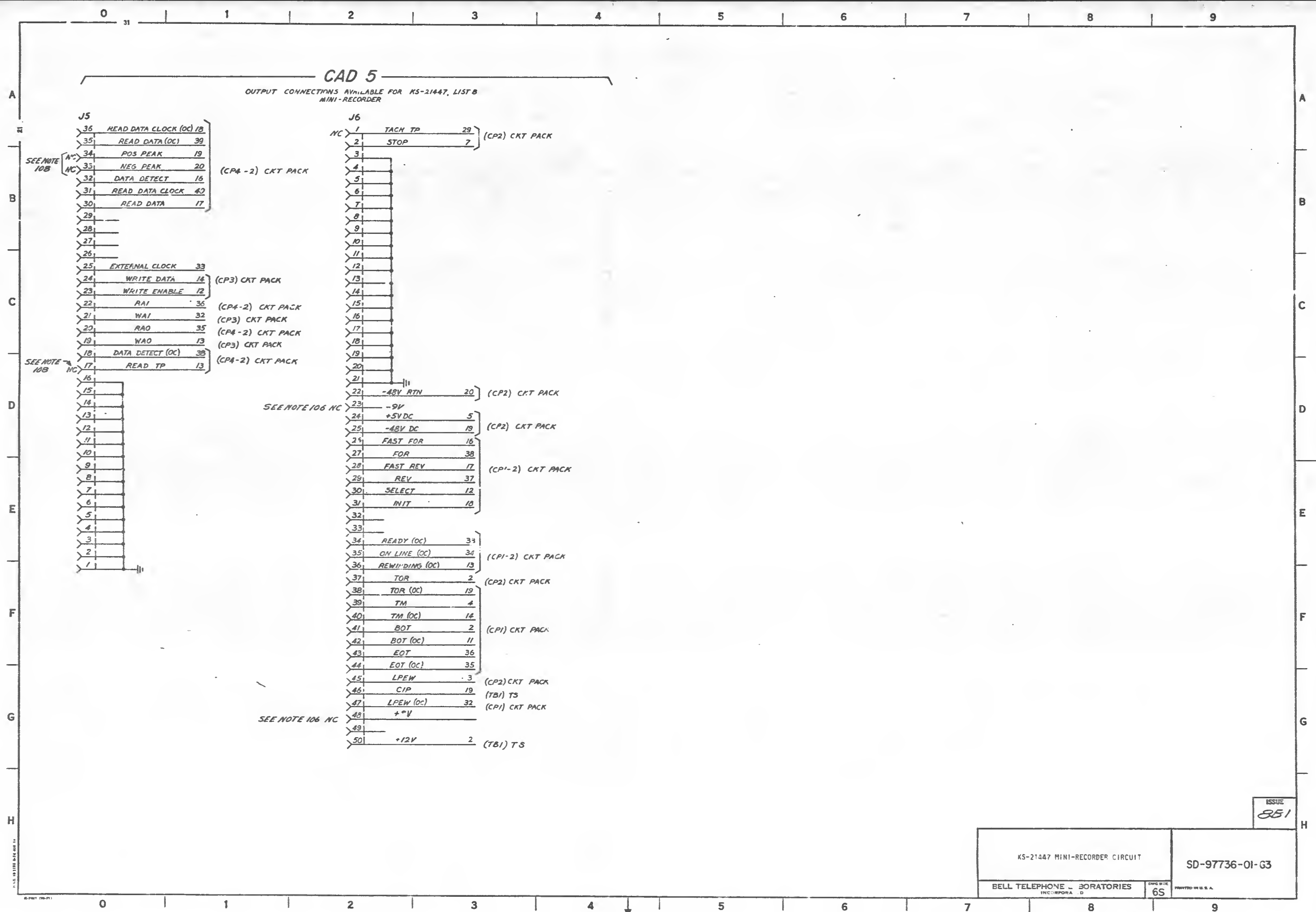


CAD 4

OUTPUT CONNECTIONS AVAILABLE FOR KS-21447, LIST 5, LIST 6, AND LIST 10
MINI-RECORDER



SD-97736-01-62



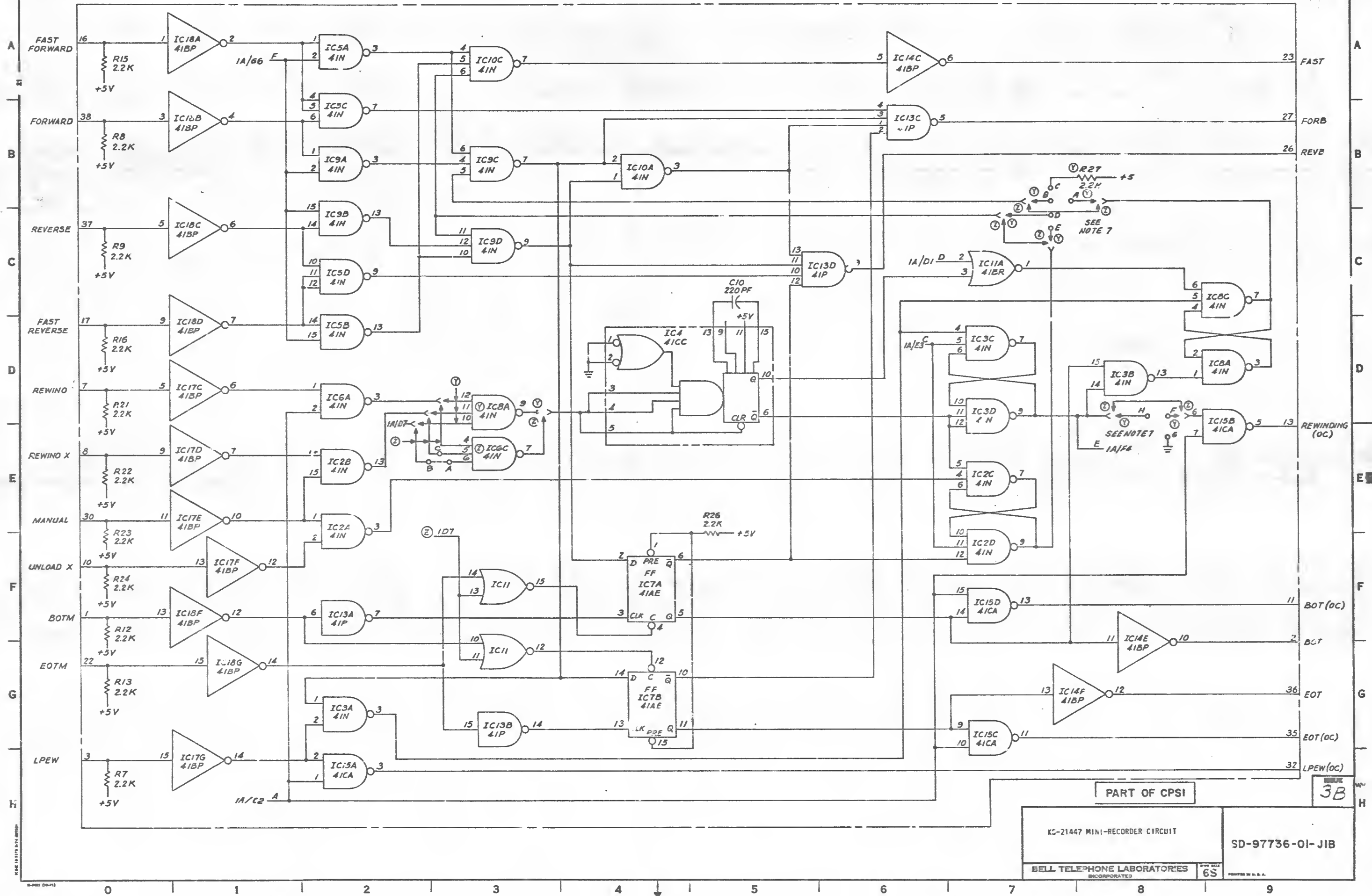
ISSUE
851

LOGIC AND CONTROL CIRCUIT



FILE
2B1

PART OF CPSI-1 & CPSI-2 LOGIC AND CONTROL CIRCUIT



SD-97736-01-J1B

PART OF CPSI

KC-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES

SD-97736-01-J1B

6S

3B

PART OF CPSI-1 & CPSI-2 LOGIC & CONTROL CIRCUIT

COMPONENT LIST

CAPACITOR

DESIG	CODE
C1	602A,40
C2	KS-19774,L14,.1
C4	KS-19774,L14,.1
C6	KS-19774,L14,.1
C8	KS-19774,L14,.22 (SEE NOTE 9)
C9,C10	KS-19774,LB,220PF
C11-C20	KS-19774,L14,.1
C21	⑤ KS-19774,L13,.1

INTEGRATED CIRCUITS

DESIG	CODE
IC1	41CC
IC2A,B,C,D	41N
IC3A,B,C,D	41N
IC4	41CC
IC5A,B,C,D	41N
IC6A,B,C,D	41N
IC7A,B	41AE
IC8A,B,C	41N
IC9A,B,C,D	41N
IC10A,B,C,D	41N
IC11A,B,C,D	41BR
IC12	502A
IC13A,B,C,D	41P
IC14A,B,D,G	41BP
IC15A,B,C,D	41CA
IC16A,B,C,D	41CA
IC17A,B,C,D,E,F,G	41BP
IC18A,B,C,D,E,F,G	41BP

RESISTORS

DESIG	CODE
R1	⑥ KS-16645,L1,100KΩ
	⑦ KS-16645,L1,33KΩ
R2	KS-16645,L1,33KΩ
R3	KS-16645,L1,6.3MΩ
R4,R5	KS-16645,L1,1KΩ
R6	KS-16645,L1,60KΩ
R7-R10	KS-16645,L1,2.2KΩ
R11	KS-16645,L1,220KΩ
R12-R16,R18,R19,R21-R27	KS-16645,L1,2.2KΩ
R28	⑧ KS-16645,L1,60KΩ
R29	⑨ KS-16645,L1,10

TRANSISTOR

DESIG	CODE
Q1,Q2	66S

DIODE

DESIG	CODE
CR1,CR2	45BC

INPUT/OUTPUT INFORMATION

THE MOTOR CONTROL COMMANDS FORB (FORWARD), REVB (REVERSE), AND FAST ARE DECODED FROM MOTION INPUT COMMANDS FAST REVERSE, REVERSE, FAST FORWARD OR FORWARD. THE MOTOR CONTROL COMMANDS ARE ALSO A FUNCTION OF THE COMMANDS REWIND, INITIALIZE, AND THE DEPRESSING OF THE REWIND AND UNLOAD PUSHBUTTON WHILE A MANUAL COMMAND IS TRUE. THE MOTOR COMMANDS ARE ALSO INITIATED BY THE +5 VOLT SUPPLY BEING RESUMED AFTER ITS LOSS OR THE INSERTION OF A TAPE CARTRIDGE (CIP). THE MOTOR CONTROL COMMANDS WILL BE INHIBITED IF NO CARTRIDGE IS IN THE MACHINE OR IF TWO OR MORE MOTION INPUT COMMANDS ARE TRUE. THE MOTION INPUT COMMANDS, REWIND, AND THE INITIALIZE COMMAND ARE INHIBITED IF A CARTRIDGE IS NOT IN THE MACHINE OR IF THE SELECT INPUT IS HIGH. THE MOTOR COMMANDS MAY ALSO BE INHIBITED IF THE EOTM OR BOTH SIGNALS OCCUR. THE MOTOR CONTROL COMMANDS WILL BE SEQUENCED BASED ON THE BOTH AND LPEWM SIGNALS, IF A REWINDING SEQUENCE WAS INITIATED.

THE SEL 1 OUTPUT, IF HIGH, PREVENTS THE WRITE ELECTRONICS (CP3) OR READ ELECTRONICS (CP4) OPEN COLLECTOR OUTPUTS FROM GOING TRUE. THIS OUTPUT IS A FUNCTION OF THE SELECT AND CARTRIDGE IN POSITION INPUTS. THE RECORD OVERRIDE FUNCTION, IF TRUE (LOW) PREVENTS WRITING ON THE TAPE BY INHIBITING CP3.

THE SELECT INPUT HIGH (NOT SELECTED) INHIBIT THE OPEN COLLECTOR OUTPUTS - TAPE MOTION, ON LINE, READY, LPEW, EOT, BOT, REWINDING, AND TAPE OFF REEL (TOR).

TAPE MOTION MAY BE TRUE ONLY IF THE TACH (BK) SIGNAL FROM THE MOTOR TACHOMETER REACHES A LEVEL FOR THE AMPLIFIER IC12 TO REACH A LOGICAL ZERO LEVEL ON ITS OUTPUT.

THE EOT LEVEL WILL GO TRUE IF A EOTM PULSE IS RECEIVED WHILE FORB IS TRUE. THE EOT LEVEL IS SET FALSE BY THE INITIALIZE COMMAND OR BY AN EOTM PULSE RECEIVED WHILE FORB IS FALSE.

THE BOT LEVEL WILL GO TRUE IF A BOTH PULSE IS RECEIVED WHILE REVB IS TRUE. THE BOT LEVEL IS SET FALSE BY THE INITIALIZE COMMAND OR BY A BOTH PULSE RECEIVED WHILE REVB IS FALSE.

THE LPEWM LEVEL WILL GO TRUE IF A LPEWM PULSE IS SENT AND SELECT IS TRUE. THE LPEWM PULSE ALSO ENDS THE REWINDING SEQUENCE IF FORB IS TRUE.

CIRCUIT DESCRIPTION

THE PURPOSE OF CP1 IN THE KS-21447 MINI RECORDER IS TO DECODE MOTION COMMANDS FROM THE CONTROLLER AND INDICATE THE STATUS OF THE SYSTEM. THE DECODED MOTION COMMANDS ARE SENT TO CP2. THE STATUS INDICATORS ARE SENT TO CP3 AND CP4 TO CONTROL READING AND WRITING OF THE TAPE CARTRIDGE AS WELL AS TO THE I/O CONNECTOR FOR USE BY THE TAPE CONTROLLER. BY CONFIGURING THE CIRCUIT PACK AS DASH ONE, THE CARTRIDGE IN POSITION, INITIALIZE, AND POWER RESUMPTION WILL REPOSITION THE TAPE AT LOAD POINT; BY CONFIGURING THE CIRCUIT PACK A, DASH TWO, THE TAPE WILL NOT BE REPOSITIONED AT LOAD POINT BY POWER RESUMPTION CARTRIDGE IN POSITION OR INITIALIZE.

NOTES: (CONT)

5. THE TERMINAL ASSIGNMENT OF THE 66S TRANSISTOR IS



6.

HIGHEST CAP AND RES USED ON THIS DRAWING	
C27	R26
NOT USED	
C3	R20
C5	R17

7. CP1-1 L510099-1. STRAP A-B,D-E,J-K,F-H. DO NOT STRAP B-C,C-D,R-S,S-T,K-L,F-G. OMIT R27.

CP1-2 L510099-2. STRAP B-C,C-D,F-G,R-S,S-T, S-T,X-L. DO NOT STRAP A-B,F-N,D-E, AND J-K. OMIT IC1-IC4,IC8 AND C9-C11,C14-C16.

8.

RECORD OF CHANGES					
DWG ISS	PREV FURN	STAND	AM ONLY	MFR DISC	SEE NOTE
2B	Z	Y	Z		
2B		X			
3B	W	V	W		
7A1(C)					9
B81	T	S		T	

9. SAN FERNANDO ELECTRONICS IS NO LONGER AN APPROVED SUPPLIER FOR KS-19774,L14 0.22 UF CAPACITORS.

MANUFACTURING REFERENCE

CATEGORY	NO.
CIRCUIT PACK CODE	L-510099
CONNECTOR ON FRAME	90BL

SYMBOL

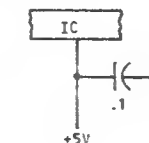
29	4
9	14
1B	34
6	2B
12	19
40	15
16	33
3B	23
37	27
17	26
7	13
8	11
30	2
10	36
1	35
22	32
3	

NOTES:

- UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, VALUES PRECEDED BY THE SYMBOL +(PLUS) OR -(MINUS) ARE IN VOLTS.
- ⊥ GROUND RETURN.
- BATTERY AND GROUND TERMINALS FOR ICs:

IC	+5V BAT TERM	GRD TERM
IC1	16	7,B
IC2,IC3	16	B
IC4	16	7,B
IC5,IC6	16	B
IC7	16	7,B
IC8-IC10	16	B
IC11	16	7,B
IC13-IC18	16	B

4. ALLOW BYPASS CAPACITORS FROM +5V TO GRD AS SHOWN BELOW.



PART OF CPSI

ISSUE 881

KS-21447 MINI-RECORDER CIRCUIT

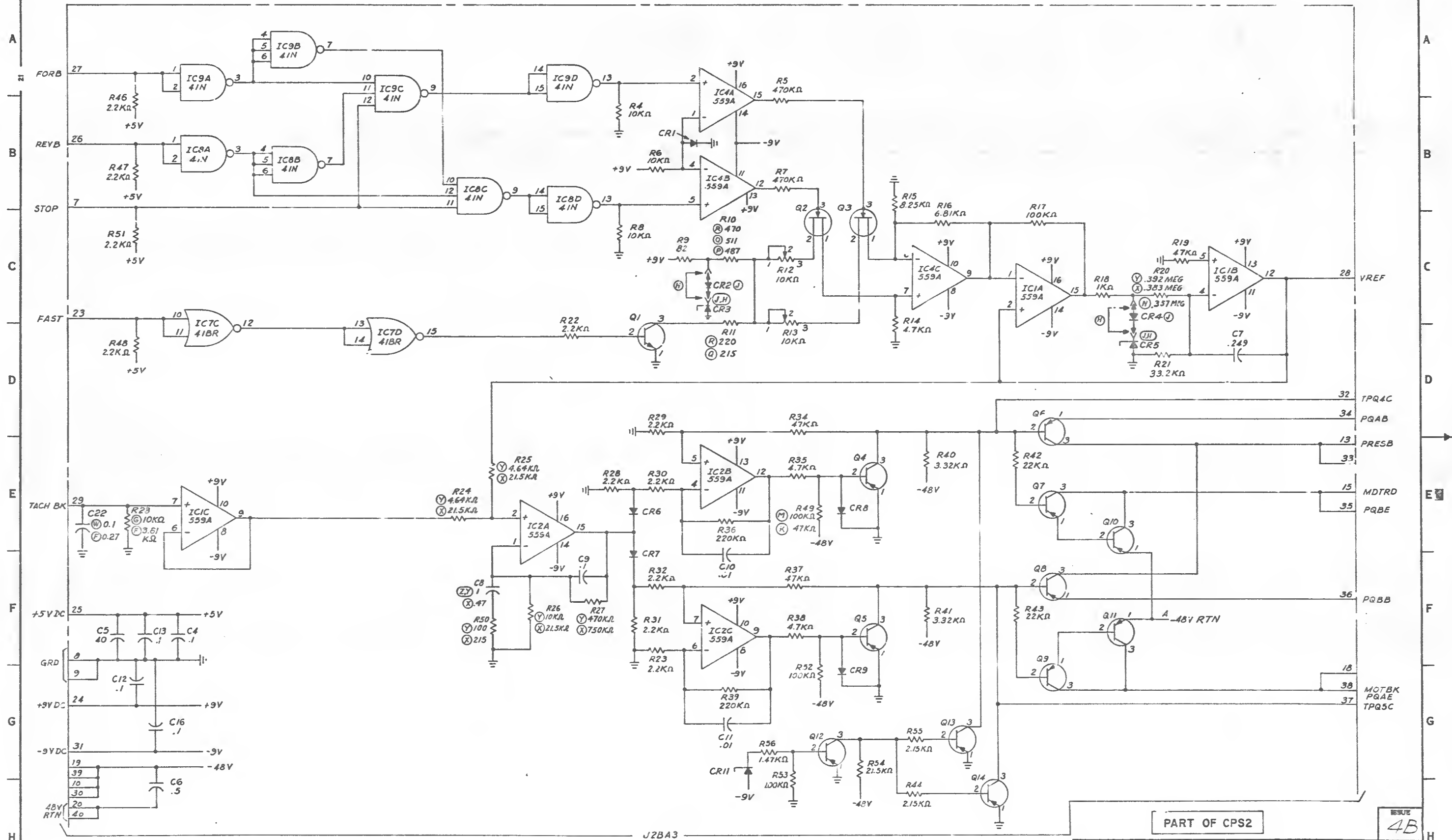
SD-97736-01-JIC

BELL TELEPHONE LABORATORIES

65

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PART OF CPS2 SERVO CIRCUIT



PART OF CPS2

4B

KS-21447 MINI-RECORDER CIRCUIT

SD-97736-01-J2A

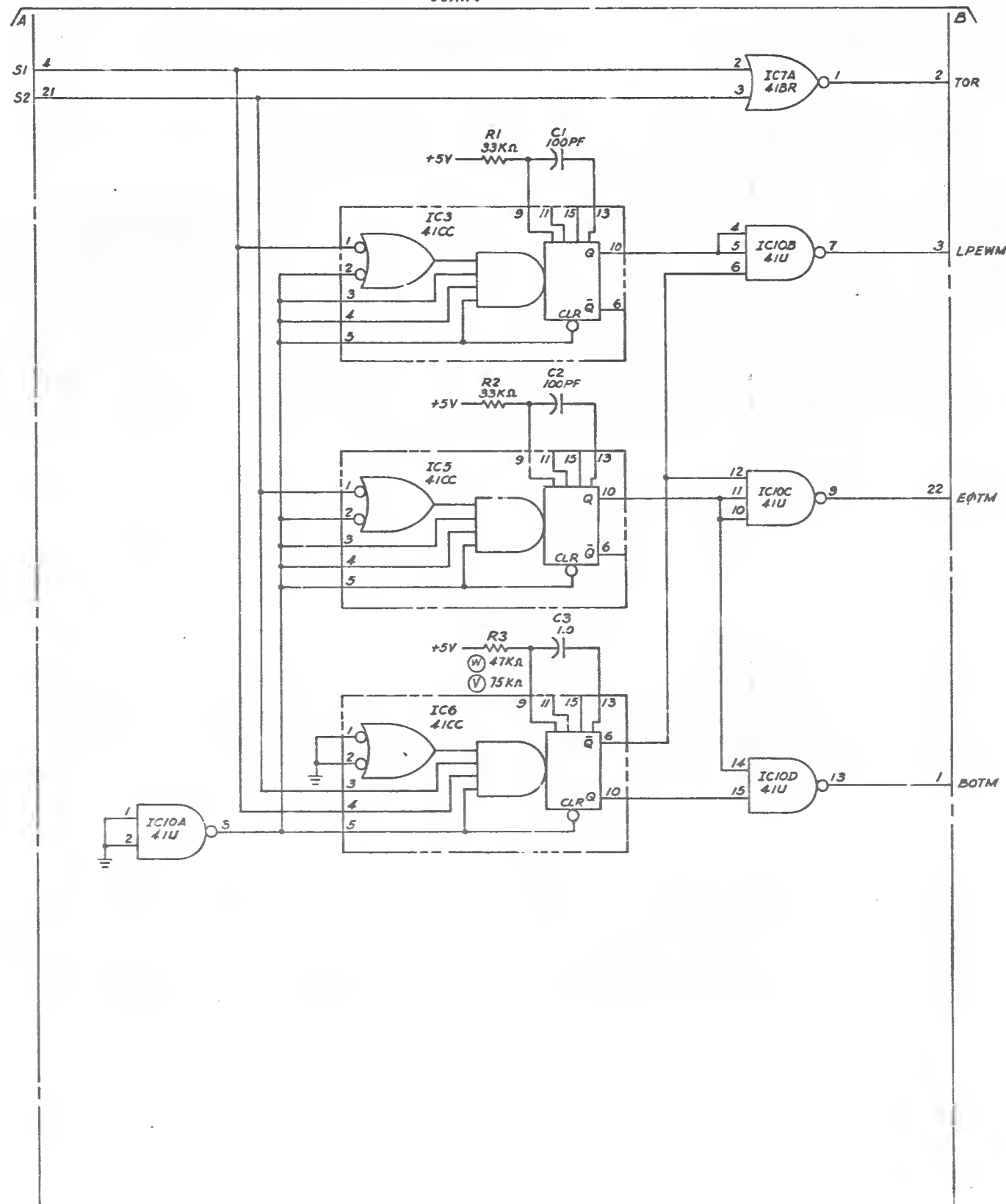
BELL TELEPHONE LABORATORIES
INCORPORATED

6S

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PART OF CPS 2 SERVO CIRCUIT

J2AH4



PART OF CPS2

3B

KS-21447 MINI-RECORDER CIRCUIT

SD-97736-01-J2B

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

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SD-97736-01-J2B

COMPONENT LIST

PART OF CPS2

SERVO CIRCUIT

INPUT/OUTPUT INFORMATION

FOR THE DC MOTOR VELOCITY CONTROL, THE INPUTS ARE THE OUTPUT OF THE TACHOMETER, PROVIDING A VOLTAGE LEVEL PROPORTIONAL TO THE MOTOR SPEED AND MOTION COMMANDS FORWARD, REVERSE, FAST AND STOP THAT ARE TTL LEVELS. THE TACH OUTPUT IS COMPARED TO A REFERENCE VOLTAGE TO PRODUCE THE ERROR VOLTAGE, WHICH IS THEN AMPLIFIED TO DRIVE THE MOTOR. THE OUTPUTS OF THE VELOCITY CONTROL SECTION CONSIST OF TWO VOLTAGE LEADS AND TWO CURRENT SINK LEADS TO DRIVE THE MOTOR BIDIIRECTIONALLY FROM A SINGLE POLARITY VOLTAGE SUPPLY (-48 VOLT).

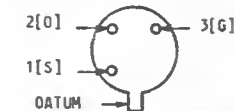
THE INPUTS FOR THE MARKER DESKEW AND DECODE CIRCUIT ARE TTL LEVELS FROM EACH OF THE TWO MARKER SENSORS S1 AND S2. THE INPUT IS HIGH WHEN A MARKER IS PRESENT. THE OUTPUTS ARE TTL MEDIUM POWER GATES THAT ARE NOMINALLY 1 MICROSECOND NEGATIVE GOING PULSES THAT SIGNAL OCCURRENCE OF BOTH LPEWM, EOTM THE TAPE OFF REEL (TOR) OUTPUT IS LOW WHENEVER EITHER SENSOR INPUT IS HIGH.

CIRCUIT DESCRIPTION

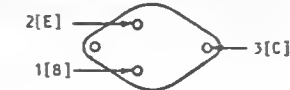
CF2 PERFORMS 2 FUNCTIONS IN THE MINI-RECORDER DIGITAL CARTRIDGE SYSTEM: 1) IT CONTROLS THE SPEED OF THE DC MOTOR WHICH DRIVES THE TAPE CARTRIDGE, AND 2). IT DESKEWS AND DECODES THE MARKER DETECTORS TO PROVIDE THE INDICATIONS OF BEGINNING OF TAPE MARKER (BOTH), LOAD POINT-EARLY WARNING MARKER (LPEWM), AND END OF TAPE MARKER (EOTM).

NOTES (CONT):

6. THE TERMINAL ASSIGNMENT OF THE 61A TRANSISTOR IS:



7. THE TERMINAL ASSIGNMENT OF THE 2N3792 TRANSISTOR IS:



HIGHEST CAP AND RES USED ON THIS CPS	
C21	R56
NOT USED	
	R45

RECORD OF CHANGES					
CHG ISSUE	PREV FURN	STAND	ASB ONLY	MFR DISC	SEE NOTE
2B	Z,Y	X	Z,Y		10
2B		W			
3B	S	T	S		
3B	W	V	W		
3B	R	Q	R		
3B	Q	P	Q		
3B	Y	N	Y		
3B	M	K	M		
4B	J	H	J		
5A	G	F	G		10
8bI	S OR T	E		S & T	

10. OPTION Z (C3, KS-19774, L10, 1.0 uF) WAS CHANGED TO KS-19774, L9, 1.0 uF TO IMPROVE MANUFACTURABILITY. OPTION X WAS MADE TO ALLOW USE OF A NEW MOTOR-TACHOMETER PACKAGE. THIS NEW CONFIGURATION CAN BE USED WITH THE OLD MOTOR-TACHOMETER (E538/110) BUT THE OLD CONFIGURATION SHOULD NOT BE USED WITH THE NEW MOTOR-TACHOMETER PACKAGE (E538/300). OPTION T REPLACED THE PREVIOUS TRANSISTORS (OPTION S) WITH ONES WITH HIGHER BREAKDOWN VOLTAGE. OPTIONS Q,P,N, AND K IMPROVED MANUFACTURABILITY. OPTION F REQUIRES DIFFERENT TACHOMETER RESISTOR VALUES THAN PREVIOUSLY FURNISHED. THE 584/D10 MOTOR REQUIRED PRECISION LOADING OF THE TACHOMETER. OPTION H PROVIDES USAGE OF AN IMPROVED VOLTAGE REFERENCE CIRCUIT.

MANUFACTURING REFERENCE

CATEGORY	NO.
CIRCUIT PACK CODE	L-S10100
CONNECTOR ON FRAME	908L

SYMBOL

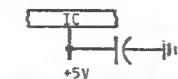
27	28
26	32
7	34
25	13
29	33
4	15
21	35
	36
	18
	38
	37
	2
	3
	22
	1
	19
	39
	10
	30
	20
	40

NOTES:

1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.
2. $\perp$ GROUND RETURN
3. BATTERY AND GROUND TERMINATIONS FOR ICS:

IC	+SV BAT TERM	GRO TERM
IC3, ICS, IC6, IC7	16	7,8
IC8, IC9, IC10	16	8

4. ALLOW BYPASS CAPACITORS FROM +SV TO GRO FOR IC3, S, 6, 7, 8 & 9. AS SHOWN BELOW:



5. THE TERMINAL ASSIGNMENT OF THE 518 & 665 TRANSISTOR IS:



PART OF CPS2

881

KS-21447 MINI-RECORDER CIRCUIT

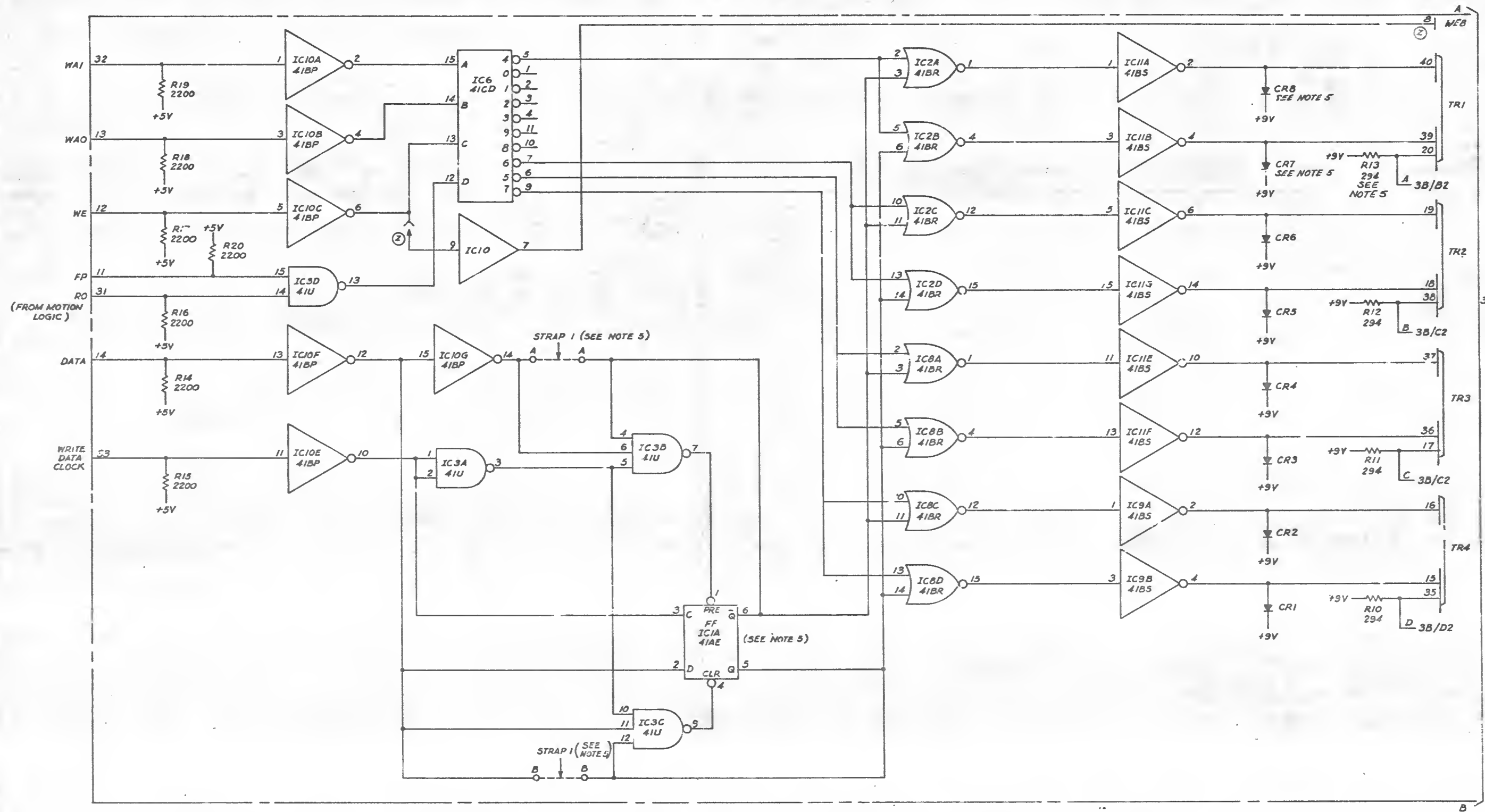
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BELL TELEPHONE LABORATORIES
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6S

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PART OF CPS3-1 THRU CPS3-4 WRITE CIRCUIT



SD-97736-01-J3A

PART OF CPS3

3B

KS-21447 MINI-RECORDER CIRCUIT

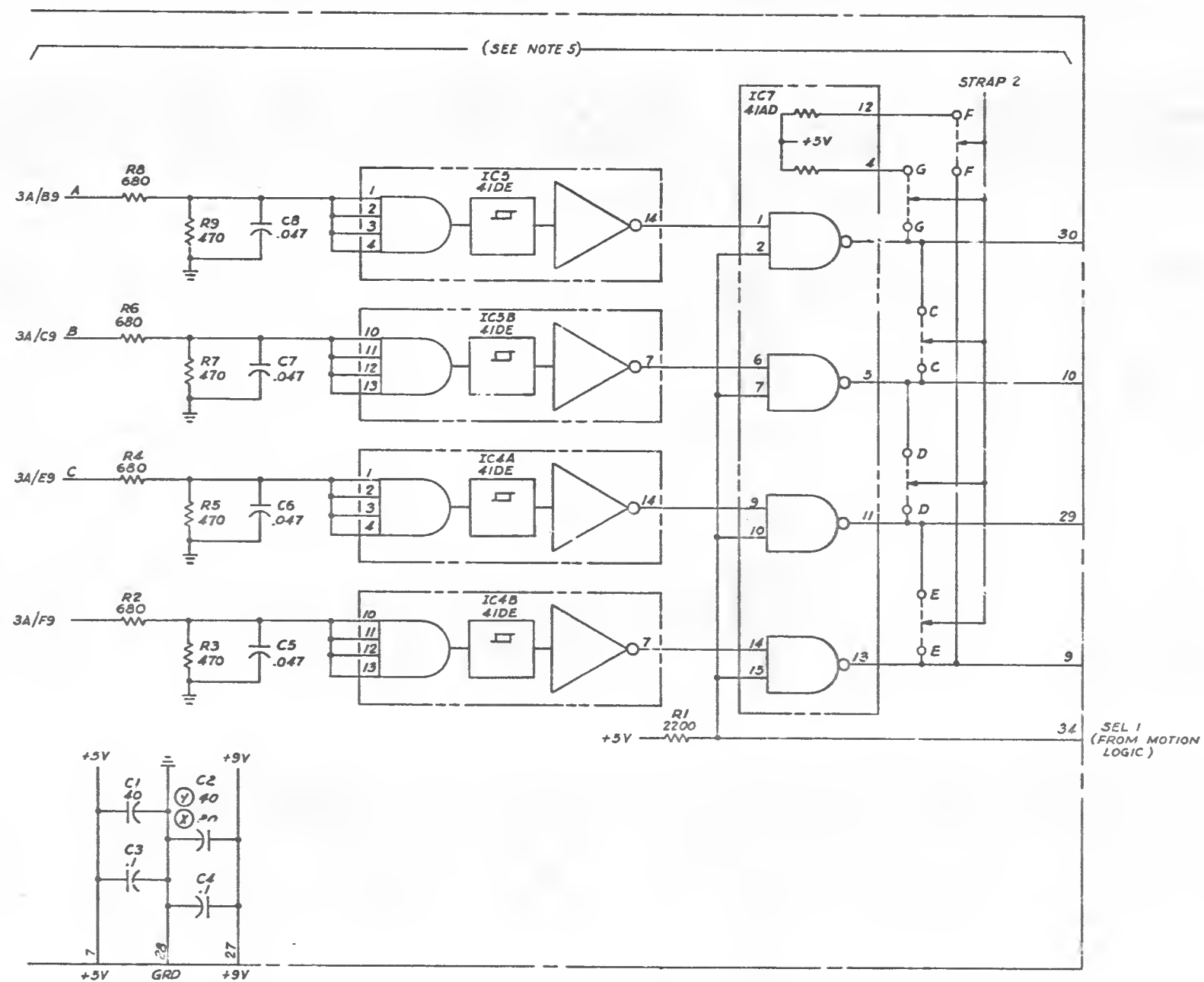
SD-97736-01-J3A

BELL TELEPHONE LABORATORIES
INCORPORATED

65

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PART OF CPS3-1 THRU CPS3-4
WRITE CIRCUIT



PART OF CPS3

881

KS-21447 MINI-RECORDER CIRCUIT

SD-97736-01-J3B

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

FORM 100-1

PART OF CPS3-1 THRU CPS3-4

WRITE CIRCUIT

COMPONENT LIST

CAPACITOR

DESIG

C1
C2

CODE

602A,40
602A,40
602C,20
KS-19774,L14, .1
C3,C4
C5-C8
C9-C19
KS-19774,L6, .047
KS-19774,L14, .1

DIODE

DESIG

CR1-CRB

CODE

45BA

INTEGRATED CIRCUITS

DESIG

IC1A
IC2A,B,C,D
IC3A,B,C,D
IC4A,B

CODE

41AE
41BR
41U
41DE

IC5A,B

41DE

IC6

41CD

IC7

41AD

IC8A,B,C,D

41BR

IC9A,B

41BS

IC10A,B,C,E,F,G

41BP

IC11A,B,C,E,F,G

41BS

RESISTOR

DESIG

R1
R2
R3
R4

CODE

KS-16645,L1,2200
KS-16645,L1, 680
KS-16645,L1, 470
KS-16645,L1, 680

R5

KS-16645,L1, 470

R6

KS-16645,L1, 680

R7

KS-16645,L1, 470

R8

KS-16645,L1, 680

R9

KS-16645,L1,470

R10-R13

KS-20810,L1A,294

R14-R20

KS-16645,L1,2200

INPUT/OUTPUT INFORMATION

ALL INPUTS ARE TTL COMPATIBLE WHERE A LOGIC ONE IS DEFINED TO BE LESS THAN 0.4 VDC AND A LOGIC ZERO IS GREATER THAN 2.4 VDC. THE OUTPUT TO THE HEAD IS DRIVEN BY OPEN COLLECTOR-HIGH VOLTAGE TTL DRIVERS (IC9,11).

CIRCUIT DESCRIPTION

THE PURPOSE OF CP3 IN THE KS-21447 MINI-RECORDER IS TO DECODE THE WRITE TRACK SELECTED AND PROVIDE WRITE CURRENT TO THE WRITE HEAD IN SERIAL PHASE ENCODED FORMAT. IT IS POSSIBLE VIA STRAP WIRES AND COMPONENT DELETIONS TO WRITE TWO OR FOUR TRACKS: TO SELECT THE TYPE OF INPUT, I.E., CLOCKED DATA OR PHASE ENCODED; OR SELECT A TRACK POWER DETECTION OPTION. INPUT FROM THE LOGIC AND CONTROL ELECTRONICS (CP1) CAN INHIBIT WRITING OF DATA, AS WILL THE WRITE ENABLE COMMAND AND FILE PROTECT SWITCH. INPUT DATA CAN BE CLOCKED INTO THE BOARD, IN WHICH CASE STRAP 1 IS REMOVED. IF PHASE ENCODED DATA IS PRESENTED DELETE IC1 AND INSERT STRAP 1.

TO DRIVE ONLY A TWO TRACK HEAD IC8, IC9, CR1-CR4, R10 & R11 CAN BE DELETED.

TO CHOOSE ANOTHER OPTION OF TRACK POWER DETECTION INCLUDE IC4, IC5 AND IC7. IF THE WIRED OR OPTION IS DESIRED FOR OUTPUT PRESENTATION, JUMPERS C-C, D-D, E-E, F-F AND G-G.

IF WRITE PROTECTION OF TRACK ONE IS DESIRED, DELETE R13,CR7 AND CR8.

NOTES (CONT):

5. CP3-1 L510102-1
ADD STRAP 1
REMOVE STRAP 2, R1-R9, C5-C8, IC1, IC4, IC5, IC7 AND ASSOCIATED LEADS.
CP3-2 L510102-2
REMOVE STRAP 1 AND 2, R1-R9, C5-C8, IC4, IC5, IC7 AND ASSOCIATED LEADS.
CP3-3 L510102-3
REMOVE STRAPS 1 AND 2
CP3-4 L510102-4
REMOVE STRAP 2 AND IC1
ADD STRAP 1
CP3-5 L510102-5
ADD STRAP 1.
REMOVE STRAP 2, R1-R9, R13, C5-C8, IC1, IC4, IC5, IC7, CR7, AND CR8 AND ASSOCIATED LEADS.

HIGHEST CAP AND RES USED ON THIS CPS	
CB	R20
NOT USED	

RECORD OF CHANGES					
DWG ISS	PREV FURN	STAND	ASM ONLY	MFR DISC	SEE NOTE
ZB		Z			
BUI	Y	X		Y	

NOTES:

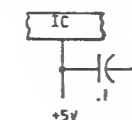
1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.

2. $\perp$ GROUND RETURN.

3. BATTERY AND GROUND TERMINATIONS FOR ICs:

IC	+5V BAT TERM	GRD TERM
IC1-IC3	16	8
IC4-IC8	16	7,8
IC9-IC11	16	8

4. ALLOW BYPASS CAPACITORS FROM 5 TO GRD FOR IC2, 3, 6, 9 & 11 AS SHOWN BELOW.



MANUFACTURING REFERENCE	
CATEGORY	NO.
CIRCUIT PACK CODE	L-510102 -1 THRU -4
CONNECTOR ON FRAME	908L

SYMBOL	
32	40
13	39
12	20
11	19
31	18
14	38
33	37
WRITE CIRCUIT	
	36
	17
	16
	15
	35
	30
	10
	29
	9
	34
	8

PART OF CPS3

KS-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

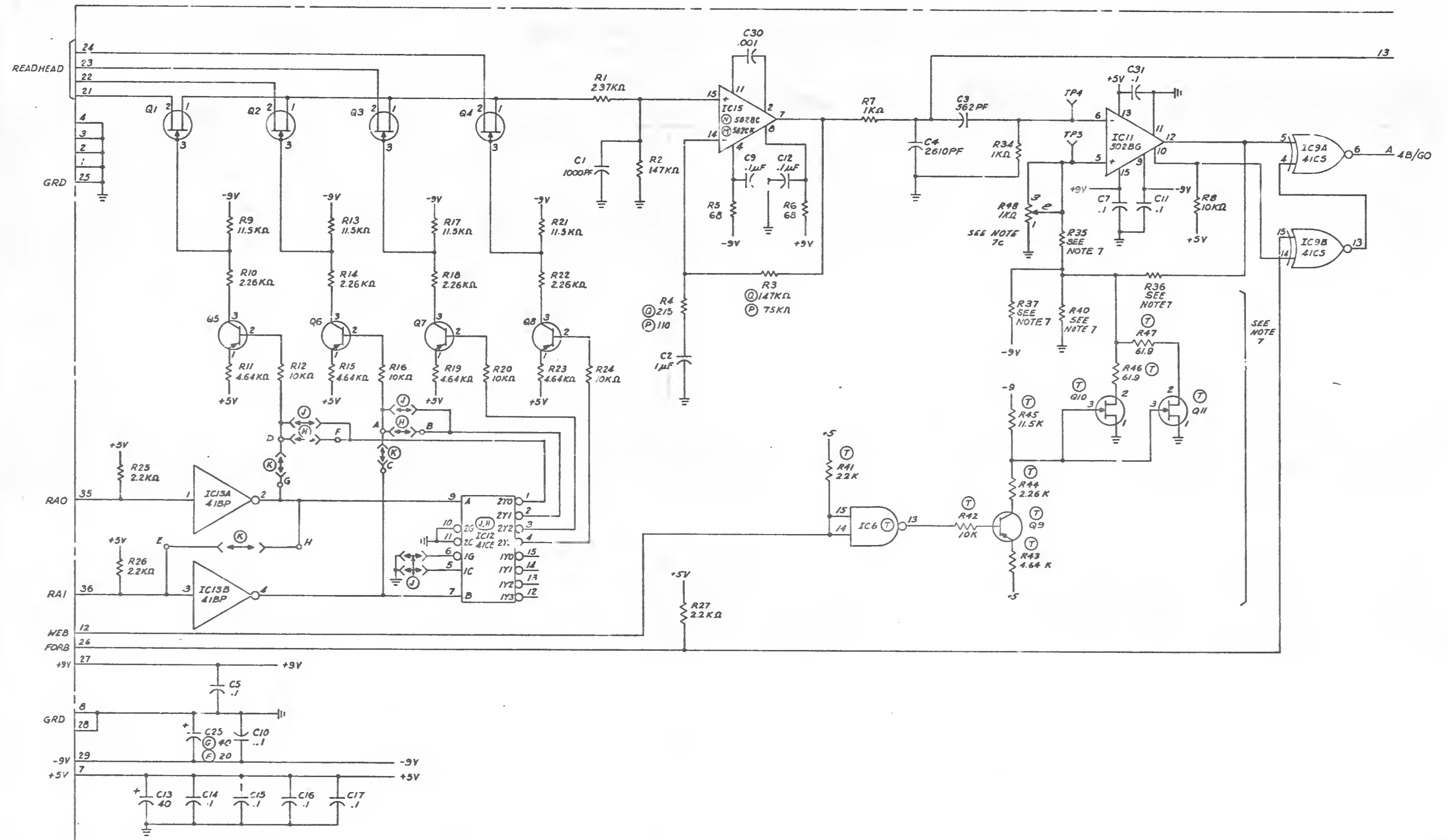
SD-97736-01-J3C

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SD-97736-01-J3C

⑧ PART OF CPS4-1 THRU CPS4-4

READ CIRCUIT
SEE NOTES 9 & 10



SD-97736-01-J4A

PART OF CPS4

KS-21447 MINI-RECORDER CIRCUIT

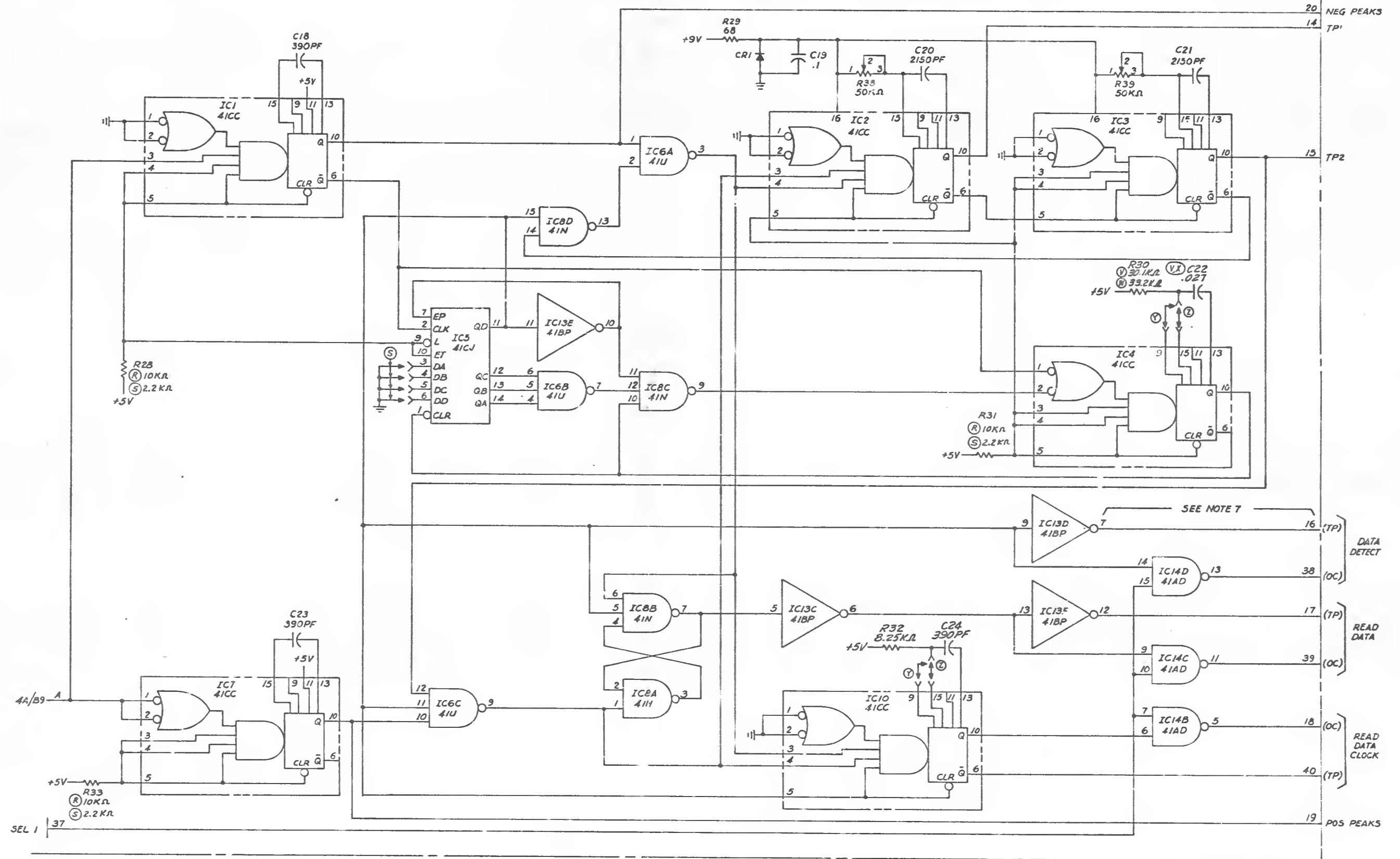
BELL TELEPHONE LABORATORIES
INCORPORATED

SD-97736-01-J4A

6S

② PART OF CPS4-1 THRU CPS4-4

READ CIRCUIT
SEE NOTES 9 & 10



PART OF CPS4

KS-21447 MINI-RECORDER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

SD-97736-01-J48

6S

SD-97736-01-J48

⑥ PART OF CPS4-1 THRU CPS4-4

READ CIRCUIT
(SEE NOTES 9 & 10)

COMPONENT LIST

CAPACITORS

DESIG	CODE
C1	719A, 1000PF
C2	KS-19774, L10, 1.0
C3	719A, 562PF
C4	719A, 2610PF
C5	KS-19774, L14, .1
C7	KS-19774, L14, .1
C8	KS-19774, L14, .1
C9	KS-19774, L14, .1
C10	KS-19774, L14, .1
C11	KS-19774, L14, .1
C12	KS-19774, L14, .1
C13	602A, 40
C14	KS-19774, L14, .1
C15	KS-19774, L14, .1
C16	KS-19774, L14, .1
C17	KS-19774, L14, .1
C18	KS-19774, L8, 390PF
C19	KS-19774, L14, .1
C20	719A, 2150PF
C21	719A, 2150PF
C22	KS-19774, L1, .027
C23	KS-20977, L4, .027
C24	KS-19774, L8, 390PF
C25	602C, 20
C26	602A, 40
C30	KS-19774, L2, .001
C31	KS-19774, L14, .1

DIODES

DESIG	CODE
CR1	448C

INTEGRATED CIRCUITS

DESIG	CODE
IC1	41CC
IC2	41CC
IC3	41CC
IC4	41CC
IC5	41CJ
IC6A, B, C	41U
IC7	41CC
IC8A, B, C, D	41N
IC9A, B	41CS
IC10	41CC
IC11	5028G
IC12	41CE

IC13A, B, C, D, E, F
IC14B, C, D

IC15
IC15

POTENTIOMETERS

DESIG	CODE
R38	KS-19093, L8A, 50KΩ
R39	KS-19093, L8A, 50KΩ
R48	KS-19093, L7A, 1KΩ (SEE NOTE 7C)

COMPONENT LIST (CONT)

RESISTORS

DESIG	CODE
R1	KS-20616, L1A, 2.37KΩ
R2	KS-20616, L1A, 147KΩ
R3	KS-20616, L1A, 147KΩ
R4	KS-20616, L1A, 75KΩ
R5	KS-20616, L1A, 215
R6	KS-20616, L1A, 110
R7	KS-16645, L1, 68
R8	KS-20616, L1A, 1.0KΩ
R9	KS-20616, L1A, 11.5KΩ
R10	KS-20616, L1A, 2.26KΩ
R11	KS-20616, L1A, 4.64KΩ
R12	KS-20616, L1A, 10KΩ
R13	KS-20616, L1A, 11.5KΩ
R14	KS-20616, L1A, 2.26KΩ
R15	KS-20616, L1A, 4.64KΩ
R16	KS-20616, L1A, 10KΩ
R17	KS-20616, L1A, 11.5KΩ
R18	KS-20616, L1A, 2.26KΩ
R19	KS-20616, L1A, 4.64KΩ
R20	KS-20616, L1A, 10KΩ
R21	KS-20616, L1A, 11.5KΩ
R22	KS-20616, L1A, 2.26KΩ
R23	KS-20616, L1A, 4.64KΩ
R24	KS-20616, L1A, 10KΩ
R25	KS-16645, L1, 2.2KΩ
R26	KS-16645, L1, 2.2KΩ
R27	KS-16645, L1, 2.2KΩ
R28	KS-16645, L1, 10KΩ
R29	KS-16645, L1, 2.2KΩ
R30	KS-20616, L1A, 30.1KΩ
R31	KS-20616, L1A, 33.2KΩ
R32	KS-16645, L1, 10KΩ
R33	KS-20616, L1A, 8.25KΩ
R34	KS-16645, L1, 10KΩ
R35	KS-20616, L1A, 1.0KΩ
R36	KS-20616, L1A, SEE NOTE 7
R37	KS-20616, L1A, SEE NOTE 7
R40	KS-20616, L1A, SEE NOTE 7
R41	KS-16645, L1, 2.2KΩ
R42	KS-20616, L1A, 10KΩ
R43	KS-20616, L1A, 4.64KΩ
R44	KS-20616, L1A, 2.26KΩ
R45	KS-20616, L1A, 11.5KΩ
R46	KS-20616, L1A, 61.9
R47	KS-20616, L1A, 61.9

TRANSISTORS

DESIG	CODE
Q1-Q4, Q10, Q11	61A
Q5-Q8	517
Q9	51F SEE NOTE 7
Q10, Q11	61A SEE NOTE 7

INPUT/OUTPUT INFORMATION

THE TRACK SELECT INPUTS AND ALL OUTPUTS ARE TTL COMPATIBLE, WHERE A LOGIC 1 IS DEFINED TO BE LESS THAN 0.4 VDC AND A LOGIC ZERO IS GREATER THAN 2.4 VDC. THE HEAD INPUT IS A LOW LEVEL ANALOG SIGNAL.

CIRCUIT DESCRIPTION

THIS CP IS INTENDED FOR USE IN THE KS-21447 MINI-RECORDER. THE CP READS INFORMATION OFF TAPE, DECODING IT INTO DIGITAL DATA. IT IS INTENDED ONLY FOR READING THE 1600 bpi, (3200 frpi) PHASE ENCODED, FORMAT FROM A TAPE RUNNING AT 30 INCHES PER SECOND, EITHER FORWARD OR REVERSE.

THE CIRCUIT SELECTS 1 OUT OF 4 TRACKS, BASED ON THE STATE OF THE INPUTS R40 AND R41. DATA IS DETECTED (DATA DETECT OUTPUT GOES LOW), ONLY WHEN AT LEAST 8 NEGATIVE TRANSITIONS ARE DETECTED IN LESS THAN 200USEC. WHEN STARTING TO READ A BLOCK OF DATA, THE FIRST SEVEN CHARACTERS ARE STRIPPED FROM THE OUTPUT STREAM. DATA DETECT GOES FALSE WHEN NO TRANSITIONS ARE DETECTED FOR A PERIOD OF 200USEC. WHEN DATA DETECT IS HIGH, THE READ DATA AND READ DATA CLOCK OUTPUTS ARE HELD HIGH. WHEN DATA DETECT IS LOW, THE READ DATA LINE MAY BE READ ON EACH POSITIVE TRANSITION OF THE READ DATA CLOCK LINE. THIS CLOCK IS A NORMALLY HIGH NEGATIVE GOING PULSE OF APPROXIMATELY 1 USED IN DURATION. THE SELT INPUT WILL DISABLE ALL THREE (DATA DETECT, READ DATA AND READ DATA CLOCK) OUTPUTS (FORCE THEM HIGH) WHEN HELD LOW.

THE UNIT CAN BE CONFIGURED FOR A TWO TRACK SYSTEM WITH TOTEM POLE OUTPUTS BY DELETING IC14, Q3, Q4, Q7-Q11, R17-R24, R42-R47, AND BYPASS CAPACITOR FOR IC12 & IC14.

THE UNIT CAN BE CONFIGURED FOR STANDARD FOUR TRACK OPERATION WITH OPEN COLLECTOR OUTPUTS DELETING R42-R47, Q9-Q11. A CERTIFIER CONFIGURATION CAN BE BUILT BY ADDING R48 IN PLACE OF R35 AND R40 AS PER NOTE 7C.

NOTES: (CONT)

- THE "B" OPTION ENCOMPASSES ALL CIRCUITRY, COMPONENTS AND OPTIONS, SHOWN ON SHEETS J4A, J4B & J4C PRIOR TO ISSUE 7A1(C). DUE TO NUMEROUS CHANGES ON ISSUE 7A1(C) THE READ CIRCUIT WAS REDRAWN ON ADDED SHEETS J4D, J4E, J4F & J4G WITHOUT PEPPERING CHANGED VALUES OPTIONS ETC.

NOTES ARE CONTINUED ON SHEET J4F.

NOTES (CONT):

- THE TERMINAL ASSIGNMENT OF THE 51F & 66S TRANSISTOR IS:



- THE TERMINAL ASSIGNMENT OF THE 61A TRANSISTOR IS:



- CP4-1 L510103-1
REMOVE IC14, Q3, Q4, Q7-Q11, R17-R24, R42-R47 AND C8. R35 IS 953Ω, R37 IS 44.2KΩ, R40 IS 61.9Ω, AND R36 IS 8.66KΩ.
 - CP4-2 L510103-2
REMOVE Q9-Q11 AND R42-R47, R35 IS 953Ω, R37 IS 44.2KΩ, R40 IS 61.9Ω, AND R36 IS 8.66KΩ.
 - CP4-3 L510103-3
REMOVE Q9, Q10, Q11 AND R42-R47. R37 IS 44.2KΩ, R36 IS 8.66KΩ. R48 IS 1KΩ AND IS USED IN PLACE OF R35 AND R49 TO ACHIEVE A 20% THRESHOLD.
 - CP4-4 L510103
R37 IS 56.2KΩ, R35 IS 866Ω, R36 IS 11.5KΩ, R40 IS 215Ω. (OPTION T)

PART NO.	INSTALL STRAPS*	DELETE STRAPS*
L510103-1	A-B, D-F	A-C, D-G, E-H (J-H)
L510103-2		
L510103-3	A-B, D-F	A-C, D-G, E-H
L510103-4		

* LATER ARTWORK DELETES STRAPS (ISSUE 9)

8.	HIGHEST CAP AND RES USED ON THIS CPS	
	C31	R47
	NOT USED	
	C26,C27	
	C28,C29	
	C6	

RECORD OF CHANGES					
OWG ISSUE	PREV FURN	STAND	A&M ONLY	MFR DISC	SEE NOTE
2B	Y	2	Y		
2B	V	H, X	V		
2B	T				7
3B	R	S	R		
3B	Q	P	Q		
3B	N	M	N		
3B	K, H	J	H		
7A1(C)				B	10
8B1	G	F	G		

OPTION LETTERS B & D NOT USED.
RECORD OF CHANGES CONTINUED ON SHEET J4F.

MANUFACTURING REFERENCE

CATEGORY	NO.
CIRCUIT PACK CODE	L-510103
CONNECTOR ON FRAME	908L

SYMBOL

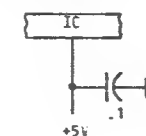
24	13
23	20
22	14
21	15
35	16
36	38
37	17
12	39
	18
	40
	19

NOTES:

- UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS. VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.
- GROUND RETURN.
- BATTERY AND GROUND TERMINATIONS FOR ICs:

IC	+5V BAT TERM	GND TERM
IC1-IC4	16	7, 8
IC5, IC6	16	8
IC7	16	7, 8
IC8	16	8
IC9	16	7, 8
IC10	16	7, 8
IC11	13	11
IC12-IC14	16	8

- ALLOW BYPASS CAPACITORS FROM +5V TO GND FOR IC1-IC7, IC10, IC12



PART OF CPS4

ISSUE

7A1(C)

KS-21447 MINI-RECORDER CIRCUIT

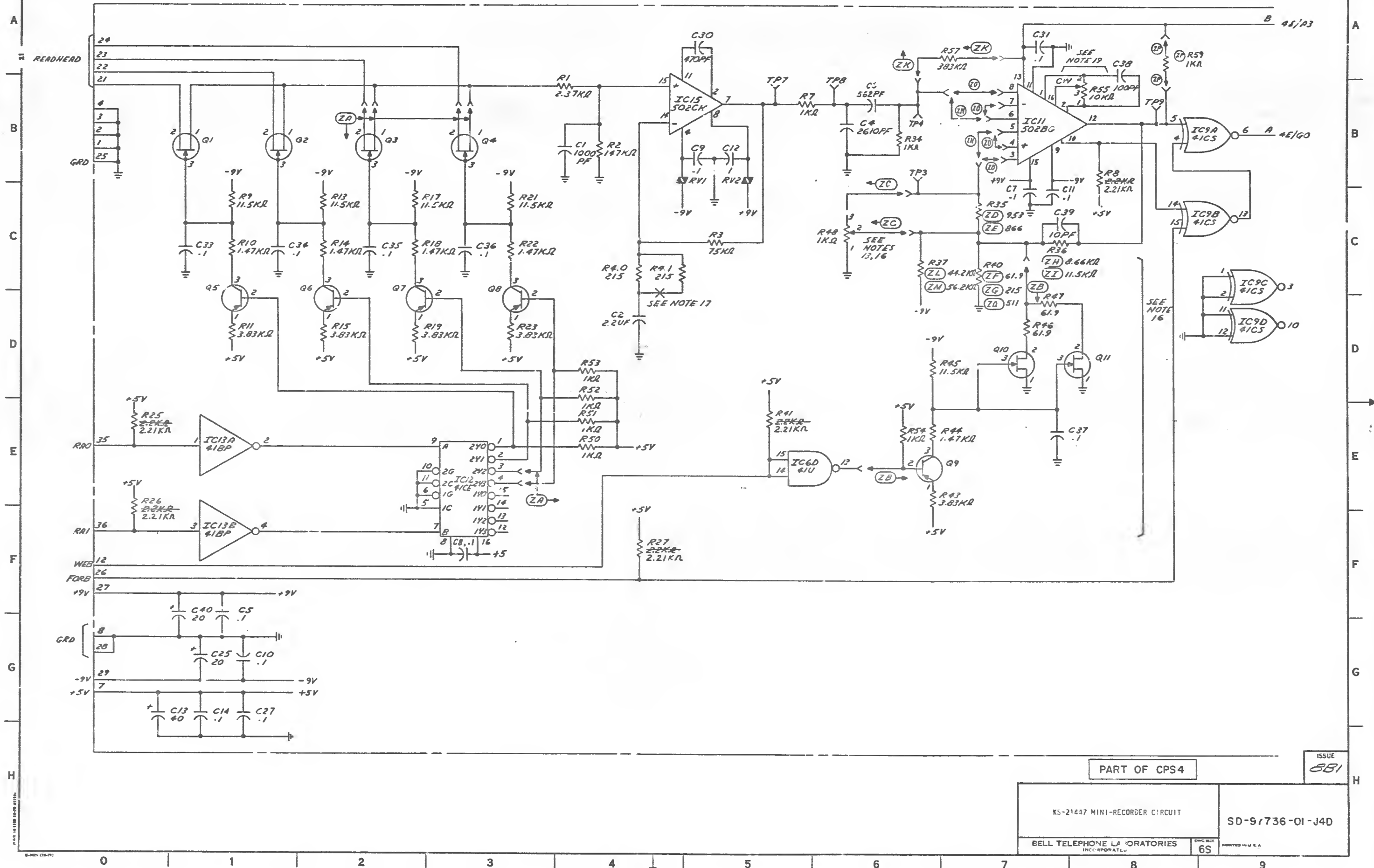
SD-97736-01-J4C

BELL TELEPHONE LABORATORIES

6S

PRINTED IN U.S.A.

①PART OF CPS4-1 THRU CPS4-4
READ CIRCUIT
SEE NOTES 9, 10, 15 & 16



PART OF CPS4

ISSUE
881

KS-21447 MINI-RECORDER CIRCUIT

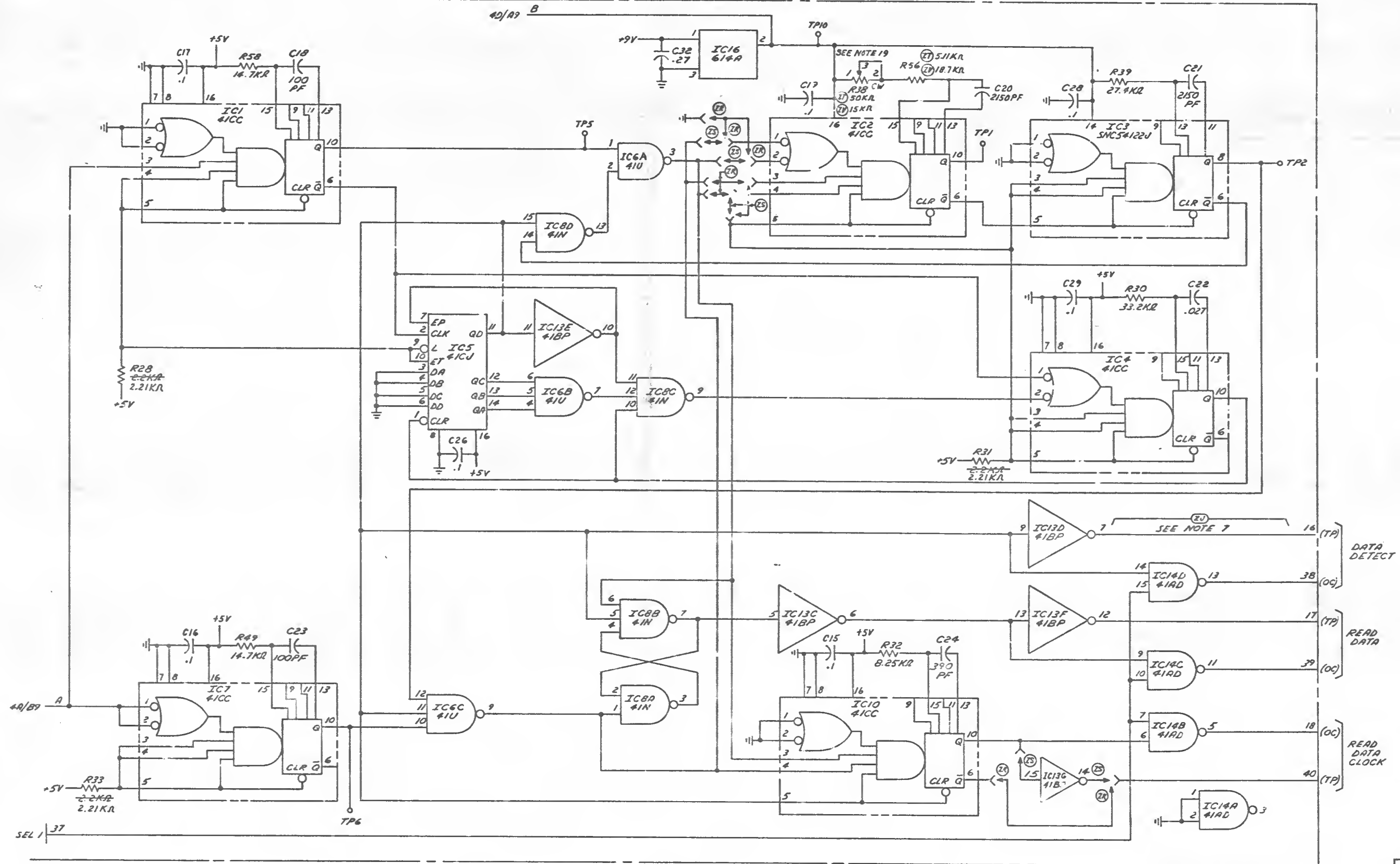
SD-9/736-01-J4D

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

PRINTED IN U.S.A.

② PART OF CPS4-1 THRU CPS4-4
READ CIRCUIT
SEE NOTES 9, 10, 15 & 18



PART OF CPS4

ISSUE
881

KS-2147 MINI-RECORDER CIRCUIT

SD-97736-01-J4E

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

PRINTED IN U.S.A.

④PART OF CPS4-1 THRU CPS4-4

READ CIRCUIT
SEE NOTES 9,10,15 & 18

COMPONENT LIST

DESIG	CODE
C1	719A, 1000PF
C2	KS-19774, L9, 2.2
C3	719A, 562PF
C4	719A, 2610PF
C5	KS-19774, L14, .1
C7	KS-19774, L14, .1
C8	KS-19774, L14, .1
C9	KS-19774, L14, .1
C10	KS-19774, L14, .1
C11	KS-19774, L14, .1
C12	KS-19774, L14, .1
C13	602A, 40
C14	KS-19774, L14, .1
C15	KS-19774, L14, .1
C16	KS-19774, L14, .1
C17	KS-19774, L14, .1
C18	KS-16958, L32, 100PF
C19	KS-19774, L14, .1
C20	719A, 2150PF
C21	719A, 2150PF
C22	KS-20977, L4, .027
C23	KS-16958, L32, 100PF
C24	KS-19774, L7, 390PF
C25	602C, 20
C26	KS-19774, L14, .1
C27	KS-19774, L14, .1
C28	KS-19774, L14, .1
C29	KS-19774, L14, .1
C30	KS-19774, L1, 470PF
C31	KS-19774, L14, .1
C32	KS-19774, L14, .27
C33	KS-19774, L14, .1
C34	KS-19774, L14, .1
C35	KS-19774, L14, .1
C36	KS-19774, L14, .1
C37	KS-19774, L14, .1
C38	KS-16958, L32, 100PF
C39	KS-19774, L1, 10PF
C40	602C, 20

INTEGRATED CIRCUITS

DESIG	CODE
IC1	41CC
IC2	41CC
IC3	SNCS4122J, TEXAS INSTR
IC4	41CC
IC5	41CJ
IC6A,B,C,D	41U
IC7	41CC
IC8A,B,C,D	41N
IC9A,B,C,D	41CS
IC10	41CC
IC11	5028G
IC12	41CE
IC13A,B,C,D,E,F,G	41BP
IC14A,B,C,D	41AO
IC15	502CK
IC16	614A

POTENTIOMETERS

DESIG	CODE
*R38	KS-19646, L3, 50KΩ
R38	KS-19646, L3, 15KΩ
R48	KS-19093, L8A, 1KΩ
*R55	KS-19646, L3, 10KΩ

*SEE NOTE: 19 & 20

COMPONENT LIST (CONT)

RESISTORS	
DESIG	CODE
R1	KS-20616, L1A, 2.37KΩ
R2	KS-20616, L1A, 147KΩ
R3	KS-20616, L1A, 75KΩ
R4.0	KS-20616, L1A, 215
R4.1	KS-20616, L1A, 215 (SEE NOTE 17)
R7	KS-20616, L1A, 1.0KΩ
R8	KS-16645, L1, 2.2KΩ KS-20616, L1A, 2.21KΩ
R9	KS-20616, L1A, 11.5KΩ
R10	KS-20616, L1A, 1.47KΩ
R11	KS-20616, L1A, 3.83KΩ
R13	KS-20616, L1A, 11.5KΩ
R14	KS-20616, L1A, 1.47KΩ
R15	KS-20616, L1A, 3.83KΩ
R17	KS-20616, L1A, 11.5KΩ
R18	KS-20616, L1A, 1.47KΩ
R19	KS-20616, L1A, 3.83KΩ
R21	KS-20616, L1A, 11.5KΩ
R22	KS-20616, L1A, 1.47KΩ
R23	KS-20616, L1A, 3.83KΩ
R25	KS-16645, L1, 2.2KΩ KS-20616, L1A, 2.21KΩ
R26	KS-16645, L1, 2.2KΩ KS-20616, L1A, 2.21KΩ
R27	KS-16645, L1, 2.2KΩ KS-20616, L1A, 2.21KΩ
R28	KS-16645, L1, 2.2KΩ KS-20616, L1A, 2.21KΩ
R30	KS-20616, L1A, 33.2KΩ
R31	KS-16645, L1, 2.2KΩ KS-20616, L1A, 2.21KΩ
R32	KS-20616, L1A, 8.25KΩ
R33	KS-16645, L1, 2.2KΩ KS-20616, L1A, 2.21KΩ
R34	KS-20616, L1A, 1.0KΩ
R35	KS-20616, L1A, 953
R36	KS-20616, L1A, 866
R36	KS-20616, L1A, 8.66KΩ
R36	KS-20616, L1A, 11.5KΩ
R37	KS-20616, L1A, 44.2KΩ
R37	KS-20616, L1A, 56.2KΩ
R39	KS-20616, L1A, 27.4KΩ
R40	KS-20616, L1A, 51.1
R40	KS-20616, L1A, 61.9
R40	KS-20616, L1A, 215
R41	KS-16645, L1, 2.2KΩ KS-20616, L1A, 2.21KΩ
R43	KS-20616, L1A, 3.83KΩ
R44	KS-20616, L1A, 1.47KΩ
R45	KS-20616, L1A, 11.5KΩ
R46	KS-20616, L1A, 61.9
R47	KS-20616, L1A, 61.9
R49	KS-20616, L1A, 14.7KΩ
R50	KS-20616, L1A, 1KΩ
R51	KS-20616, L1A, 1KΩ
R52	KS-20616, L1A, 1KΩ
R53	KS-20616, L1A, 1KΩ
R54	KS-20616, L1A, 1KΩ
R56	KS-20616, L1A, 5.11KΩ
R56	KS-20616, L1A, 18.7KΩ
R57	KS-20616, L1A, 383KΩ
R58	KS-20616, L1A, 14.7KΩ
R59	KS-20616, L1A, 1KΩ
TRANSISTORS	
DESIG	CODE
Q1, Q2	61E
Q3, Q4	61E
Q5, Q6	51F
Q9	51F
Q10, Q11	61E
Q7, Q8	51F

VARIABLES

DESIG	CODE
RV1, RV2	100J

INPUT/OUTPUT INFORMATION

THE TRACK SELECT INPUTS AND ALL OUTPUTS ARE TTL COMPATIBLE, WHERE A LOGIC 1 IS DEFINED TO BE LESS THAN 0.4 VCC AND A LOGIC ZERO IS GREATER THAN 2.4 VCC. THE HEAD INPUT IS A LOW LEVEL ANALOG SIGNAL.

CIRCUIT DESCRIPTION

THIS CP IS INTENDED FOR USE IN THE KS-21447 MINI-RECORDER, THE CP READS INFORMATION OFF TAPE, DECODING IT INTO DIGITAL DATA. IT IS INTENDED ONLY FOR READING THE 1600 bpi, (3200 (rpi) PHASE ENCODED, FORMAT FROM A TAPE RUNNING AT 30 INCHES PER SECOND, EITHER FORWARD OR REVERSE.

THE CIRCUIT SELECTS 1 OUT OF 4 TRACKS, BASED ON THE STATE OF THE INPUTS R40 AND R41. DATA IS DETECTED (DATA DETECT OUTPUT GOES LOW), ONLY WHEN AT LEAST 8 NEGATIVE TRANSITIONS ARE DETECTED IN LESS THAN 200 USEC. WHEN STARTING TO READ A BLOCK OF DATA, THE FIRST SEVEN CHARACTERS ARE STRIPPED FROM THE OUTPUT STREAM. DATA DETECT GOES FALSE WHEN NO TRANSITIONS ARE DETECTED FOR A PERIOD OF 200 USEC. WHEN DATA DETECT IS HIGH, THE READ DATA AND READ DATA CLOCK OUTPUTS ARE HELD HIGH. WHEN DATA DETECT IS LOW, THE READ DATA LINE MAY BE READ ON EACH POSITIVE TRANSITION OF THE READ DATA CLOCK LINE. THIS CLOCK IS A NORMALLY HIGH NEGATIVE GOING PULSE OF APPROXIMATELY 1 USEC IN DURATION. THE SEL1 INPUT WILL DISABLE ALL THREE (DATA DETECT, READ DATA AND READ DATA CLOCK) OUTPUTS (FORCE THEM HIGH) WHEN HELD LOW.

NOTES: (CONT)

HIGHEST CAP AND RES USED ON THIS CPS
C40 .59
NOT USED
C6 R5, R6, R12
R16, R20, R24
R29, R42

15.	RECORD OF CHANGES (CONT FROM J4C)					
	GWG 15' E	PREV FURN	STAND	A&M ONLY	MFR DISC	SEE NOTE
	7A1 (C)	B	A	B		10, 1
8B1		ZN	ZO		ZN	
		NONE	ZP			
		ZF, ZG	ZG, ZQ		ZF	
		ZR	ZS		ZR	
		ZT	ZV		ZT	

16. FEATURE OPTION DEFINITIONS

OPTION DESIG	FEATURE DESCRIPTION	COMPONENTS AFFECTED
ZA	CHANGES TWO TRACK CIRCUIT TO FOUR TRACK OPERATION.	ADDS: Q3, Q4, Q7, Q8, C35, C36, R17, R18, R19, R21, R22, R23, R52, & R53.
Z3	PROVIDES CAPABILITY TO HAVE DIFFERENT THRESHOLDS DURING READING AND WRITING.	ADDS: Q9, Q10, Q11, C37, R43, R44, R45, R46, R47 & R54.
ZC	PROVIDES CAPABILITY TO ADJUST THRESHOLD FOR CERTIFIER CONFIGURATION.	ADDS: R48 POTENTIOMETER (OMIT R35 & R40)
ZD, ZE, ZF, ZG, ZQ	PROVIDES FIXED THRESHOLD.	ZD ADDS R35 = 953Ω ZE ADDS R35 = 866Ω ZF ADDS R40 = 61.9Ω ZG ADDS R40 = 215Ω ZQ ADDS R40 = 51.1Ω (OMIT R48)
ZH, ZI	PROVIDES FIXED FEEDBACK RESISTORS.	ZH ADDS R36 = 8.66KΩ ZI ADDS R36 = 11.5KΩ
ZJ	PROVIDES OPEN COLLECTOR OUTPUTS.	ADDS IC14
ZK	PROVIDES POSITIVE OFFSET VOLTAGE.	ADDS R57
ZL, ZM	PROVIDES NEGATIVE OFFSET VOLTAGE.	ZL ADDS R37 = 44.2KΩ ZM ADDS R37 = 56.2KΩ

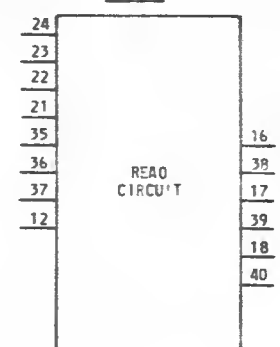
17. IF THE HEAD OUTPUT IS HIGH THE CONNECTION TO R4.1 MAY BE CUT TO REDUCE AMPLIFIER GAIN. THIS IS DETERMINED AT TIME OF MANUFACTURE.

NOTES ARE CONTINUED ON SHEET J4G.

MANUFACTURING REFERENCES

CATEGORY	NO.
CIRCUIT PACK CODE	L-510103
CONNECTOR ON FRAME	908L

SYMBOL

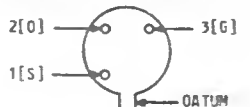


NOTES: (CONT): FROM SH J4C

11. THE TERMINAL ASSIGNMENT OF THE 51F TRANSISTOR IS:



12. THE TERMINAL ASSIGNMENT OF THE 61E TRANSISTOR IS:



13. SEE RECORD OF CHANGES TABLE (NOTE 15) FOR MFR. DISC OPTIONS

CP DESIG	PART NO.	PROVIDE OPTIONS	TYPE OF READ CIRCUIT
CP4-1	L510103-1	ZD, ZF, ZH, ZK, ZQ	TWO TRACK SYSTEM WITH TOTEM POLE OUTPUTS.
CP4-2	L510103-2	ZA, ZO, ZF, ZH, ZJ, ZK, ZQ	FOUR TRACK SYSTEM WITH OPEN COLLECTOR AND TOTEM POLE OUTPUTS.
CP4-3	L510103-3	ZA, ZC, ZH, ZJ, ZL	CERTIFIER CONFIGURATION WITH OPEN COLLECTOR AND TOTEM POLE OUTPUTS. FOUR TRACK SYSTEM.
CP4-4	L510103-4	ZA, ZB, ZE, ZG, ZI, ZJ, ZM	FOUR TRACK SYSTEM WITH DIFFERENT THRESHOLDS DURING READING AND WRITING. OPEN COLLECTOR AND TOTEM POLE OUTPUTS.

KS-21447 MINI-RECORDER CIRCUIT

DWG SIZE

65

ISSUE

881

BELL LABORATORIES

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-J4F

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0 1 2 3 4 5 6 7 8 9

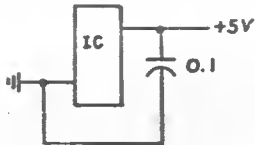
31.23

©PART OF CPS4-1 THRU CPS4-4
READ CIRCUIT
SEE NOTES 9,10,15 & 18

- NOTES: (CONT) FROM SH J4F
18. THE "A" OPTION ENCOMPASSES ALL CIRCUITRY COMPONENTS AND FEATURE OPTIONS SHOWN ON SHEETS J40, J4E, J4F. DUE TO NUMEROUS CHANGES THE READ CIRCUIT WAS REDRAWN FOR CLARITY WITHOUT SHOWING CHANGES AS OPTIONS. PREVIOUS CIRCUIT COMPONENT VALUES, OPTIONS, ETC., HAVE BEEN RETAINED ON SHEETS J4A, J4B, J4C.
19. POTENTIOMETERS R38 AND R55 ARE INITIALLY SET AT TIME OF MANUFACTURE AND SHALL NOT BE READJUSTED IN THE FIELD.
20. KS-19646,L3A MAY BE SUBSTITUTED FOR KS-19646,L3.
21. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS,
CAPACITANCE VALUES ARE IN MICROFARADS,
VALUES PRECEDED BY THE SYMBOL + (PLUS)
OR - (MINUS) ARE IN VOLTS.
22. $\perp$ GROUND RETURN.
23. BATTERY AND GROUND TERMINATIONS FOR ICs:

IC	+5V BAT. TERM.	GRD TERM.
IC1,IC2	16	7,8
IC3	14	7
IC4	16	7,8
IC5,IC6	16	8
IC7	16	7,8
IC8	16	8
IC9	16	7,8
IC10	16	7,8
IC11	13	11
IC12-IC14	16	8

24. ALLOW BYPASS CAPACITORS FROM +5V TO GRO FOR IC1-IC7, IC10, IC12 AT AT IC.

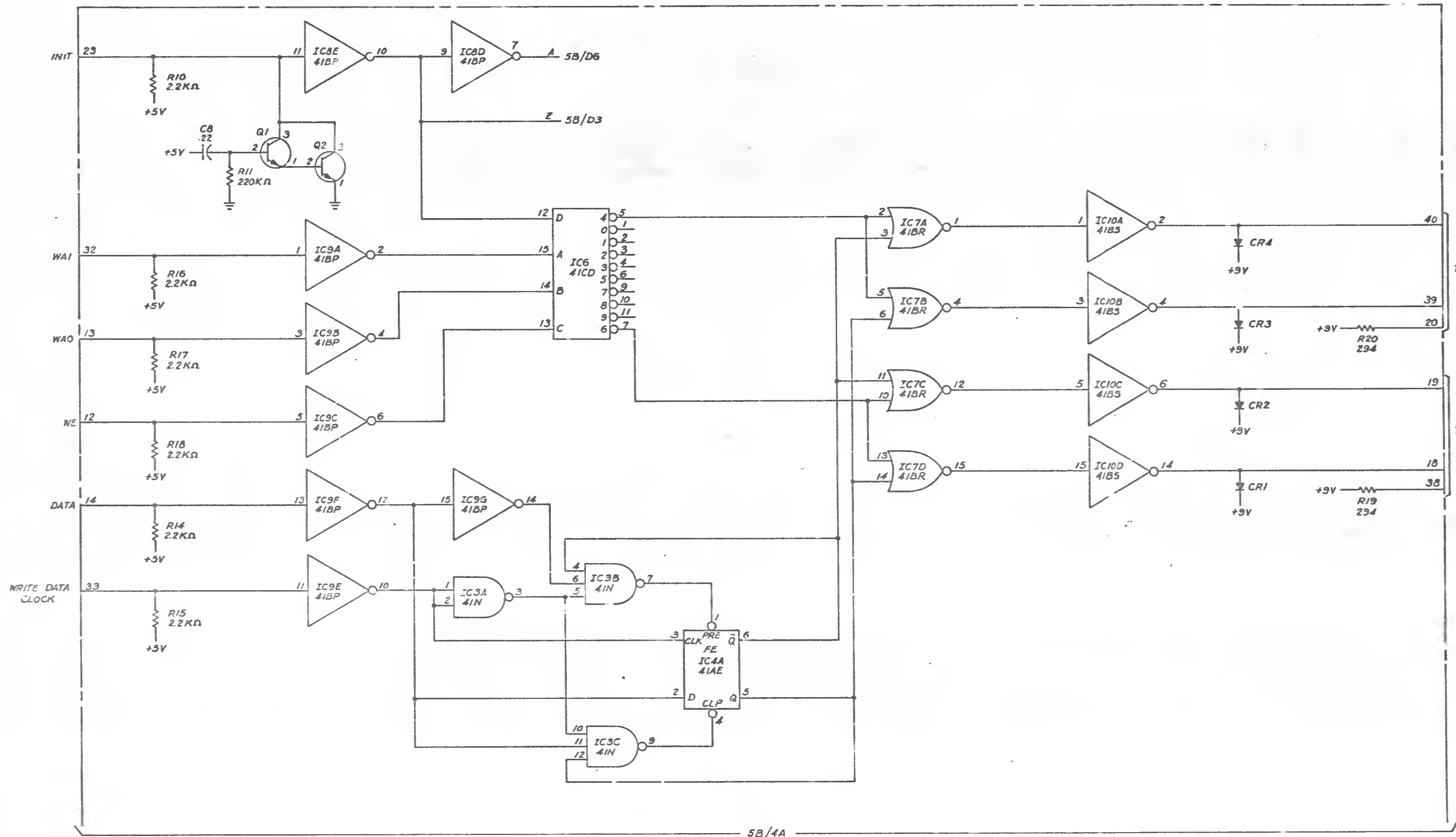


KS-21447 MINI-RECORDER CIRCUIT

DWG SIZE 6S	ISSUE 7A1(C)
BELL LABORATORIES	SD-97736-01
	-J4G

U.S. GOVT. PRINTING OFFICE: 1965 O - 348-100

PART OF CPS5 LOGIC AND WRITE CIRCUIT



PART OF CPS5

ISSUE
3B

KS-21447 MINI-RECORDER CIRCUIT

SD-97736-01-J5A

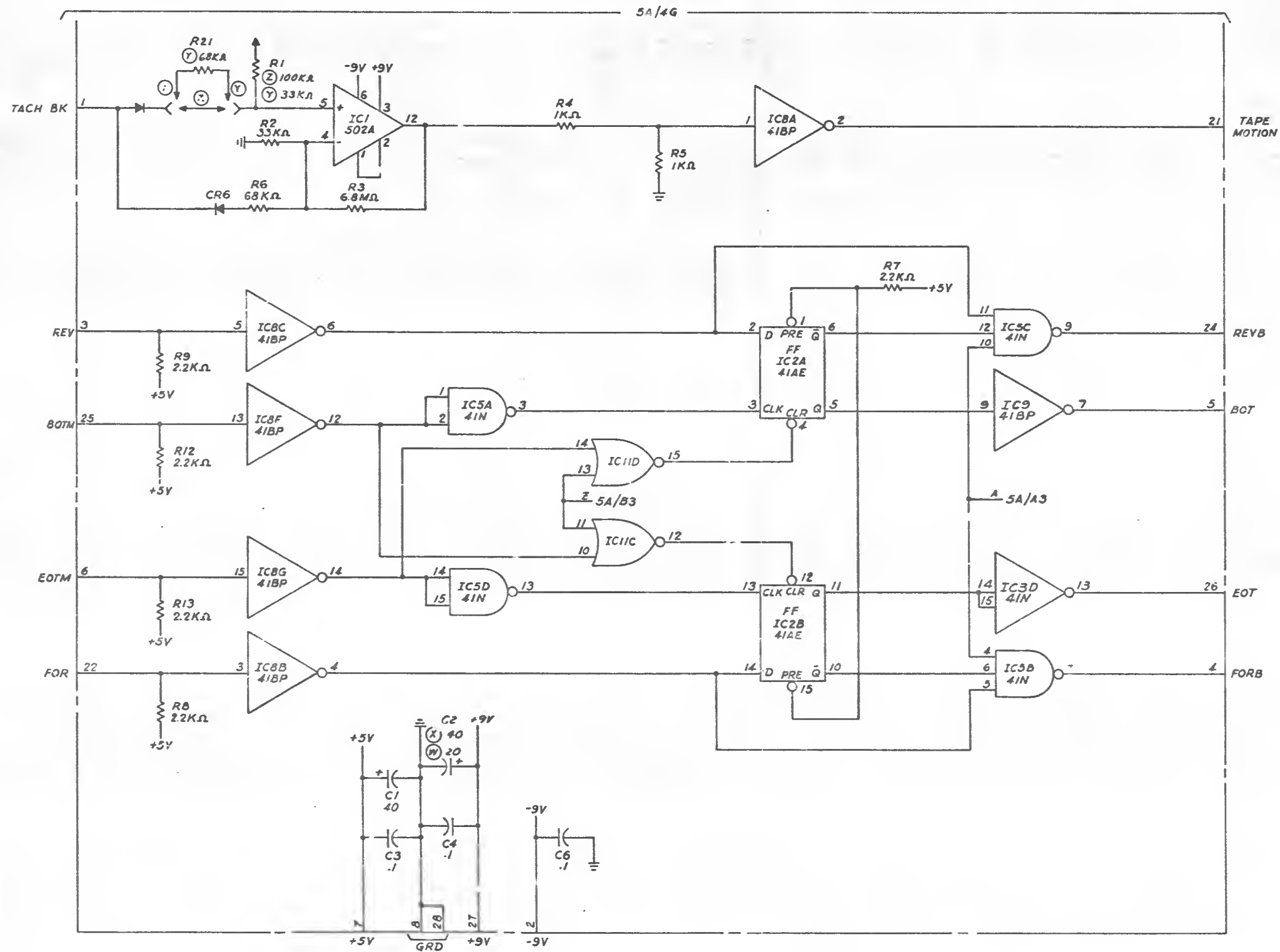
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6S

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SD-97736-01-J5A

PART OF CPS5 LOGIC AND WRITE CIRCUIT



SD-97736-01-J5B

PART OF CPS5

ISSUE
881

KS-21447 MINI-RECORDER CIRCUIT

SD-97736-01-J5B

BELL TELEPHONE LABORATORIES
INCORPORATED

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PART OF CPS5
LOGIC & WRITE CIRCUIT

COMPONENT LIST

CAPACITOR

DESIG

C1,
C2

C3,C4

C6
C8

CODE

602A, 40
602A, 40

602C, 20
KS-19774, L14, .1

KS-19774, L14, .1

KS-19774, L14, .22 (SEE NOTE B)

INPUT/OUTPUT INFORMATION

THE TACH(BK) INPUT IS THE OUTPUT OF THE DC TACHOMETER PROVIDING A VOLTAGE LEVEL PROPORTIONAL TO SPEED. ALL OTHER INPUTS ARE TTL COMPATIBLE WHERE A LOGIC ZERO IS DEFINED TO BE A VOLTAGE LEVEL GREATER THAN 2.4 VDC AND A LOGIC ONE IS LESS THAN 0.4 VDC.

THE OUTPUTS TO THE WRITE HEAD ARE FROM AN OPEN COLLECTOR, HIGH VOLTAGE TTL GATE. ALL OTHER OUTPUTS ARE TTL COMPATIBLE.

INTEGRATED CIRCUITS

DESIG

IC1

IC2A,B

IC3A,B,C,D

IC4A

IC5A,B,C,D

IC6

IC7A,B,C,D

IC8A,B,C,D,E,F,G

IC9F,B,C,D,E,F,G

IC10A,B,C,D

IC117,0

CODE

502A

41AE

41N

41AE

41N

41CO

41BR

41BP

41BP

41BS

41BR

DIGIDE

DESIG

[4]CR1-CR4

CR5 CR6

CODE

45BA

45AC

RESISTOR

DESIG

R1

R2

R3

R4,R5

R6

[4]R7-R10

R11

[7]R12-R18

R19,R20

R21

CODE

KS-16645, L1, 100K Ω

KS-16645, L1, 33K Ω

KS-16645, L1, 33K Ω

KS-16645, L1, 6.8M Ω

KS-16645, L1, 1K Ω

KS-16645, L1, 68K Ω

KS-16645, L1, 2.2K Ω

KS-16645, L1, 220K Ω

KS-16645, L1, 2.2K Ω

KS-20810, L1A, 294

KS-16645, L1 68K Ω

TRANSISTOR

DESIG

Q1,Q2

CODE

66S

NOTES (CONT.):

HIGHEST CAP AND RES USED ON THIS CPS	
C8	R20
NOT USED	
C5,C7	

MANUFACTURING REFERENCE

CATEGORY	NO.
CIRCUIT PACK CODE	L-510101
CONN LTR ON FRAME	90BL

RECORD OF CHANGES					
DWG ISSUE	PREV FURN	STAND	A&M ONLY	MFR DISC	SEF NOTE
3B	Z	Y	Z		
7AI(C)					B
B2*	K	W		X	

B. KS-19774, L14, 0.22UF CAPACITORS MAY NOT BE PURCHASED FROM SAN FERNANDO ELECTRONICS DUE TO HIGH LEAKAGE CURRENT.

SYMBOL

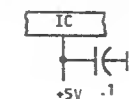
23	40
32	39
13	20
12	19
14	18
33	38
1	21
3	24
25	5
6	76
22	4

NOTES:

- UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.
- $\oplus$ GROUND RETURN.
- BATTERY AND GROUND TERMINATIONS FOR ICs:

IC	+5V BAT TERM	GRD TERM
IC2	16	7,8
IC3	16	8
IC4	16	7,8
IC5,IC6	16	8
IC7-IC10	16	7,8

- ALLOW BYPASS CAPACITORS FROM +5V TO GRD FOR IC2,3,7,8 AND IC9.



- THE TERMINAL ASSIGNMENT OF THE 66S TRANSISTOR IS:



PART OF CPS5

ISSUE
881

KS-21447 MINI-RECORDER CIRCUIT

SD-97736-01-J5C

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